

UNIVERSITY OF NAIROBI
INSTITUTE OF DIPLOMACY AND INTERNATIONAL STUDIES (IDIS)

**CLIMATE CHANGE, RESOURCE SCARCITY AND VIOLENT CONFLICT
IN THE HORN OF AFRICA
A CASE STUDY OF TURKANA COUNTY, KENYA**

By

JAMES. O. OUDA

R52/81093/2015

Supervisor: Dr. Shazia Chaudry

**A Research Project submitted in partial fulfilment for the award of the Degree in
Masters of Arts in International Conflict Management, Institute of Diplomacy and
International Studies, University of Nairobi.**

13th October, 2017.

Declaration

I affirm that this Master Thesis is my unique work and has not been offered for another academic award in any other University or Institution. Any thoughts from others or literal quotations are clearly acknowledged.

Signature

Date

James O. Ouda

This Research Project has been submitted for assessment with my endorsement as University Supervisor.

Signature

Date

Dr. Shazia Chaudry
Institute of Diplomacy and International Studies,
University of Nairobi.

Dedication

This work is dedicated to my loving wife Syprose Awuor and our children whose patience, motivation and encouragement to work harder to better our future have been a source of strength and inspiration during this study. It is my prayer that I have planted a seed of determination in our children and I hope they will learn the vital lesson that hard work pays and it is never too late to try and succeed.

Acknowledgements

I want to thank the Almighty God for his favour, love and grace that was sufficient enough for me to undertake and complete this study. I am deeply indebted and grateful to my supervisor Dr Shazia Chaudry for her guidance and support. With her wealth of expertise and experience, she provided suggestions and ideas that enabled my continuous improvement. Her ability to patiently go through the research project and correct the flow of the study cannot be taken for granted. I would not have gotten a better supervisor.

My sincere appreciation goes to my employer; Kenya Defence Forces for allowing me time off to study and improve my knowledge despite the tight work schedule. I want to thank my colleagues who stood in for me while I was away.

My gratitude goes to people of Turkana County who granted me time for interviews and shared their experience and perspectives. Without you, this study would not have been possible. Thank you all.

Lastly, I want to thank my family for being so understanding and tolerant for the period I was preoccupied with the study and hardly gave them any attention.

Abstract

Climate change is an environmental issue. However, it is today regarded more as a threat to peace and security rather than being just an environmental problem. The Intergovernmental Panel on Climate Change (IPCC) has identified climate change as a major threat to Africa. Climate change has also taken a centre stage in the international political arena. According to the Climate Change Vulnerability Index for 2015, Africa has the largest number of countries, standing at seven out of ten, which are considered to be most at risk from climate change. Climate change is amplifying the risk of violent conflict and civil unrest due to scarcity of food, water, land and energy. The continent of Africa produces the least amount of greenhouse gases which is the major contributor to global warming yet there is evidence to show that climate change precipitation has affected food production and availability of fresh water thus negatively affecting the health, livelihoods and overall security of people in Africa. Natural resource based conflicts between communities are on the rise due to climate change induced resource scarcity. In the Horn of Africa region, desertification has resulted into violent conflict between herders and farmers because of pasture and arable land scarcity. The region is affected by declining agricultural yields and prolonged droughts. Turkana County which lies in the semi-arid North western Kenya is greatly affected by the increased temperatures and unpredictable rainy seasons. There is pressure on water resources and grazing land resulting in diminished livestock herds and frequent violent conflict among Turkana communities and also with their neighbours such as the Pokot, the Samburu, the Orma of Ethiopia Toposa of South Sudan and Karamojong of Uganda. Competition for the scarce food will definitely lead to conflict and insecurity. This study examined the link between climate change, resource scarcity and violent conflict in Turkana County and suggested possible conflict resolutions in terms of climate change governance in order to enhance adaptation and coping mechanisms among the Turkana people. The objectives of the study were to establish the impacts of climate change on resource scarcity in the Horn of Africa, determine the effects of resource scarcity on violent conflict particularly in Turkana and to critically assess the role of climate governance in resolving violent conflict in this region. The study relied on Homer Dixon's Environmental Resource Scarcity Theory to explain the links between climate change, resource scarcity and violent conflict. The theory assumes that resource scarcity is a product of environmental hazards that lead to insufficient supply, too much demand or an unequal distribution of a resource that forces some sector of a society into a condition of deprivation and violence. The scarcities are as a result of population growth, economic development, pollution and climate change. The study employed both secondary and primary data through making use of expert interviews with individuals who hold theoretical and practical knowledge on quantifiable environmental problems, notably environmental scarcity - farmland, water, grassland, and fish to establish their influence to conflict in Turkana County. The study targeted fifteen key informants distributed across climate research, security, and academia and non-governmental organizations. Interviews and discussions were transcribed and qualitatively analysed to draw explanatory patterns and generalize the assumptions that underpin this case study. The key issues as mentioned above were the causal links of climate change, environmental resource scarcity and violent conflict. Further the research looked at ways to resolve violent conflict through climate change governance strategies.

TABLE OF CONTENTS

Declaration.....	ii
Dedication.....	iii
Acknowledgements.....	iv
Abstract.....	v
TABLE OF CONTENTS	vi
List of Figures.....	viii
Abbreviations.....	x
CHAPTER ONE	1
INTRODUCTION TO THE STUDY	1
1.0 Introduction.....	1
1.1 Statement of the Research Problem	4
1.2 Research Questions.....	5
1.3 Objectives of the study.....	5
1.4 Literature Review.....	6
1.5 Gaps in the literature	22
1.6 Hypotheses of the Study	23
1.7 Justification of the Study.....	23
1.8 Theoretical Framework.....	24
1.9 Research Methodology	25
1.9.1 Research Design.....	26
1.9.2 Study Area and Study Population	26
1.9.3 Data Collection	26
1.9.4 Sampling	27
1.9.5 Data Analysis.....	27
1.9.6 Ethical Approach	27
1.9.7 Scope and Limitation of Study.....	28
2.0 Chapter Outline.....	28
CHAPTER TWO	29
CLIMATE CHANGE AND ENVIRONMENTAL RESOURCE SCARCITYIN THE HORN OF AFRICA	29
2.1 Introduction.....	29
2.2 Climate Change and Security.....	31

2.3	Climate Change and Food Security	32
2.4	Climate Change and Low Economic Growth	34
2.5	Climate Change and violent Conflict.....	35
2.6	Environmental resource scarcity and conflict.....	38
2.7	Environmental resource scarcity, political marginalization and conflict.....	47
2.8	Climate related Institutions in Africa.....	49
2.8.1	The African Climate Centres	49
2.8.2	The African Ministerial Conference on the Environment (AMCEN).....	49
2.9	Chapter Summary	50
CHAPTER THREE.....		52
CLIMATE CHANGE AND VIOLENT CONFLICT IN TURKANA COUNTY: AN ANALYSIS		52
3.1	Introduction.....	52
3.2	Fragility of Turkana County	53
3.3	Manifestations of climate change in Turkana County	54
3.4	Climate Change and conflict.....	55
3.5	Climate Change and Cattle Rustling.....	57
3.6	Institutional Conflict Interventions	60
3.7	Chapter Summary	61
CHAPTER FOUR.....		62
CLIMATE CHANGE GOVERNANCE IN THE HORN OF AFRICA		62
4.1	Introduction.....	62
4.2	Importance of Climate Change Governance.....	62
4.3	Climate Change Governance Strategies and Challenges	68
4.4	Chapter Summary	71
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION.....		73
5.1	Introduction.....	73
5.2	Summary of Key Findings	73
5.3	Conclusion	74
5.4	Recommendations.....	75
5.4.1	Policy Framework for Climate Change Governance in Horn of Africa	75
5.4.2	Enhancing Climate Resilience and Adaptive Capacity.....	76
5.4.3	Low Carbon Growth Initiative.....	76
5.4.4	Peace Building Campaign.....	77
5.4.5	Enhancing Cross-Border Managing of Resources	78
5.4.6	Development of an Early Warning System.....	78

References.....	80
Appendix 1- Interview guide	86

List of Figures

Fig 1.0 : Nexus between climate change and conflicts in Turkana County- page 59

Abbreviations

AR4	-The Fourth Assessment Report
AU	-African Union
EWS	-Early Warning System
GHG	-Green House Gases
GPPAC	-Global Partnership for the Prevention of Armed Conflict
IGAD	-Inter-governmental Authority for Development
IGPCC	-Inter-governmental Panel on Climate Change
LEWS	-Livestock Early Warning Systems
LINKS	-Livestock Information and Knowledge System
OFDA	-Office of U.S Foreign Disaster Assistance
PRIO	-Peace Research Institute Oslo
SIDS	-Small Island Developing States
UNFCCC	-United Nations Framework Convention on Climate Change
UCDP	-Uniform Collateral Data Portal
UNDP	-United Nations Development Programme
UN	-Member of the United Nations
US	-United States of America
WRI	-World Resources Institute

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

Climate change is certainly a hot topic that has attracted the attention of not only environmentalists but scholars in other disciplines as well. Security and military analysts have also thrown themselves into the debate. Indeed, there are statements in the media and policy papers about an increased risk of a global war or/and civil conflicts that climate change may bring. While the claims of potential conflict are made, it must be noted that there is no empirical evidence to this extent. Science has shown the scope and pace of change in climate.¹

Climate change is likely to exacerbate the situation as predictions for Africa paint a picture of poor economic performance if economies in Africa continue depending on climate. It is predicted that Africa will face increasing scarce water resources. The scarcity of resources is associated with risk of conflict. Scientists have predicted that change in climate will degrade the atmosphere considerably. Alternating type of weather may possibly lead up in the redrawing of water accessibility maps, food safety, disease prevalence and coastal boundaries and consequently lead to forced migration and raising tensions that may result in new conflicts. There certainly will be individual relocation and violent conflict, depicted by various activities like, appropriation threats, skirmishes, mutiny, and inter nation or intra

¹Oli Brown and Alec Crawford, "Climate Change and Security in Africa: A study for the Nordic African Foreign Ministers Meeting" *International Institute for Sustainable Development*, 2009.

nation wars if climate change is not checked.² Climate change scholars opine that migrations induced by climate change appear in many type of weather change-to-violence scenarios.³

The extent of dilapidation and the degree it influences migration determines whether the violent scenarios can occur. Obviously, the statements in the media and policy papers demonstrate the fact that the climate change discourse has claimed its space in political dialogue. As such exploration of the nexus between impacts of climate change and violent conflict is very apparent. Scholars have suggested that climate change may lead to conflict either directly through resource scarcity and migration,⁴ or indirectly through effects on social, political and economic systems.⁵ Climate change influences resources availability including livestock which is predominantly the core of livelihood among pastoralists in the Horn of Africa. The constraint in resources has led to conflict among the pastoralists.⁶ An examination of the relationship between rain patterns and conflict in Africa by Hendrix and Salehyan revealed that there is a relationship between rainfall and social conflict. This they argued is due to many Africa's economies overreliance on agriculture.⁷

The IPCC 2007 report looked at the water system in the horn of Africa and predicted that it will continue to decrease. This can be urged to be the result of long droughts and erratic rainfall patterns that are unusual. This reduces water availability to communities that depend on pastoralism and rain fed agriculture for their livelihood. For example in northern Uganda in Kasese and Arua locations, the inhabitants rely heavily on large tracks of pasture and water

²Rafael Reuveyny, 'Climate Change Induced Migration and Violent Conflict', *Political Geography*, no.26 (2007): pp 656-73.

³Michael Werz and Laura Conley, 'Climate Change, Migration and Conflict: Addressing Complex Crisis Scenarios in the 21st Century', *Centre for American Progress*, 2012.

⁴Colin H. Kahl, *States, Scarcity, and Civil Strife in the Developing World* (Princeton: Princeton University Press, 2007); Reuveyny, 'Climate Change-Induced Migration and Violent Conflict'.

⁵ Cullen S Hendrix and Idean Salehyan, 'International Studies Association Annual Conference', in *After the Rain: Rainfall Variability, Hydro-Meteorological Disasters, and Social Conflict in Africa*. (Montreal, Quebec, 2010).

⁶Hany Besada and Nelson Sewankambo, 'Climate Change in Africa: Adaptation, Mitigation and Governance Challenges', *CIGI Special Report. The Centre for International Governance Innovation*, 2009.

⁷Hendrix and Salehyan, 'International Studies Association Annual Conference'.

for their animals. The erratic rainfall due to climate change has over the years reduced the amount of water and pasture available to them. During dry spells, the pastoralists have had to drive their animals into farmlands leading to increased tensions and conflicts between the pastoralists and farming groups.

In Sudan, the expansion of the desert has heightened tensions in the Darfur region as people are forced to seek alternative livelihood. The same conflict between pastoralists and farmers is experienced in northern Kenya and specifically in Turkana County where water and arable land is scarce yet majority of the residents considerably depend on the environmental resources for their survival. Dry months in the region would mean the resources become scarcer and more pressure is thus exerted on the available resources. Scramble for these resources lead to conflict among the people and between them and their neighbours.⁸ Furthermore the Turkana people loose their animals to drought and also floods which normally follow dry spells. These circumstances forces the people in this region to migrate to areas deemed to have resources such as water, food and pasture hence eruption of violent conflict. Even though not all conflicts in the horn of Africa can be attributed to the hazards of climate change, there is a clear demonstration that severe environmental changes pose a threat to national, regional and international peace and security. The question is, how should humanity react to these changes?

⁸Wario R Adano et al., 'Climate Change, Violent Conflict and Local Institutions in Kenya's Drylands', *Journal of Peace Research* 49, no. 1 (January 2012): 65–80

1.1 Statement of the Research Problem

The Horn of Africa is characterised with violent conflicts. The region is considered turbulent with an increase in violent livestock theft infused with dangerous weapons.⁹ A region with already prevailing tension is so vulnerable to any little change that distracts the daily lives and may result in conflict. The communities in Turkana County are nomadic and migrate with their herds in such of land to graze. In such societies, pastoral warfare and cattle rustling serve as a tool for resource and land expansion for these communities. The primary commodity for the people of Turkana are livestock, including cattle, donkeys, sheep, goats and camels. The community thus highly rely on rainfall and adopt a monadic life shifting from one temporary camp to another within a somewhat fixed geographical area.

Scholars suggest that the disputes between the communities in Turkana County are largely informed by access to resources.¹⁰ Turkana County lies in a semi-Arid region and thus receives little overall rainfall. The communities thus struggle for access to limited watering pans and holes that are available to water their cattle. It has been suggested that conflict in Turkana escalate in rainy seasons as communities compete over newly discovered aquifers and grass.¹¹ The trends of conflict in Turkana suggest that conflicts are caused by fight over limited availability of grazing land and other resources for self-sustainability.

The scarcity of resources is associated with risk of conflict. Resources are bound to become scarcer and conflicts in the County have a potential to increase as groups scramble for the scarce resources. The people of Turkana are certainly vulnerable in terms of climate change. They cannot positively cope with the consequences of changes in climate such as prolonged

⁹Kenya Human Rights Commission 2010:7

¹⁰Kenya Human Rights Commission 2010; Cheserek et al. 2012; Boone 2013; Gleditsch 2013

¹¹Witsenburg and Adano 2009:520

droughts which leads to diminished water sources, food scarcity and lack of pasture for their livestock.

Despite these noted possibilities, there seems to be a lacuna of empirical studies that have analysed the impacts progressive changes in the natural climate conditions have on violent conflict. Instead, the perennial conflict in Turkana County has been blamed on the old cultural practice of cattle rustling and theft without dealing with the root causes. The current study sought to address the gap by examining the influence of change in climate on violent conflict in the Horn of Africa and specifically in the case of Turkana County, in Kenya. The study analysed ways that can enhance the coping capability of the Turkana people and mitigate against the impacts of climate change that leads to diminished resources in order to reduce incidences of violent conflict.

1.2 Research Questions

- i. How has climate change impacted on resource scarcity in the Horn of Africa?
- ii. How does resource scarcity influence violent conflict in the Horn of Africa and particularly Turkana County?
- iii. What is the role of climate governance in resolving violent conflict in the horn of Africa, and especially in Turkana County, Kenya?

1.3 Objectives of the study

The broad objective of the study is to explore links between climate change, resource scarcity and violent conflicts in the Horn of Africa, and examine the case study of Turkana County in Kenya.

Specific objectives of the study are:

- i. To study the impacts of climate change on violent conflict in the Horn of Africa.
- ii. To determine the effects of resource scarcity on violent conflict in Turkana.
- iii. To critically assess the role of climate governance in controlling violent conflict in the Horn of Africa, as well as in Turkana County, Kenya.

1.4 Literature Review

The literature analyses the impacts of climate change on conflict in relation to environmental resource scarcity occasioned by prolonged drought. The literature reviews the impacts of natural disasters on conflict and climate induced migration. Economic and political instability is also looked at as a consequence of resource scarcity.

1.4.1 Climate Change and Conflict

The Inter-Governmental Panel on Climate Change (IPCC)¹² defines climate change as change in climate from one circumstance to another that can be identified in a defined timeframe, typically over two or three decades or longer, as a result of human action or natural variability. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC) where climate change is only attributed to direct or indirect human activity that alters the global atmosphere over a period of time. The fact that climate change may have repercussions on humans' quality of life is undisputed.¹³ Concerns for the implication of climate change on security situations exist. This concern necessitated a debate on climate change by the Security Council in 2007 and consequently establishing that it is a security issue. Climate change is seen as change in climate from one circumstance to another

¹²IPCC, 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge' (Cambridge, 2007).

¹³Gleditsch, N. P., Norda's, R., &Salehyan, I. (2007). Climate change and conflict: The migration link. Coping with Crisis Working Paper Series. New York: International Peace Academy.

in a defined timeframe as a result of human action or natural variability. The factors contributing to change in climate are outside the scope of the study. The current study will concentrate on the conceivable results of the impacts of climate change on violent conflict.

The Fourth Assessment Report (AR4) of the IPCC¹⁴ specialists contends that climate change consists of four components. The first component is change in normal temperature studied over a timeframe. The rise in normal temperatures on a worldwide scale is alluded to as 'global warming'. The second component is known as alteration in precipitation which is the alteration of rain patterns over a timeframe. This incorporates a general increment or lessening in yearly snow and rainfall. The third component is rise in sea level over a time frame. The fourth component is extreme events which mean change in recurrence as well as power of outrageous climate occasions over a timeframe.

As indicated by the IPCC heat-waves and substantial precipitation have turned out to be more incessant above generally land regions. The frequency of cool days and frosts over most land areas have declined while hot days and hot nights have increased.¹⁵ The report by IPCC while commenting on the consequences of climate change on conflict is not concrete enough because it is not based on empirical evidence.¹⁶ A report by Schwartz & Randal¹⁷ alludes to the potential of social disturbances as a result of climate change. In the report, they contend that climate change had the potential of challenging US national security in ways that needed immediate considerations.¹⁸ The position of Schwartz & Randal are echoed by 11 retired US

¹⁴IPCC, 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge' (Cambridge, 2007).

¹⁵IPCC, 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge' (Cambridge, 2007).

¹⁶Gleditsch, N. P., Norda's, R., & Salehyan, I. (2007). Climate change and conflict: The migration link. Coping with Crisis Working Paper Series. New York: International Peace Academy.

¹⁷Peter Schwartz and Doug Randall, 'An Abrupt Climate Change Scenario and Its Implications for United States National Security' (DTIC Document, 2003).

¹⁸Ibid, 20-25

military generals, given the contentions more military weight, the generals argued that in majority of volatile regions in the world, climate change is a catalyst for instability.¹⁹The potential contribution of climate change to conflict is also noted by the German Environmental Ministry that has argued that climate change can contribute to an increasing potential for conflict by interaction with a number of socio-economic factors.²⁰According to Reuveny there are three approaches people can adapt to environmental changes; live in place and do nothing, accepting the prices; stay in region and alleviate the changing conditions; or go away from the affected regions. He further suggests that picking of either of the alternatives dependent on the extent of the trouble and capabilities of mitigation.²¹ Poor mitigation capabilities will force migration on the affected, in turn, the receiving areas may be forced to share the available resources and subsequently, conflict will erupt.

Scholars have argued that there may be a relation between violent conflict and change in climate, a relationship that is characterised by two paradoxes. First, it is only in the last fifteen years that most of the processes associated with global warming and climate change have taken shape, yet in the same period, the numbers of violent conflicts have declined.²²It is therefore difficult to make future inferences based on these facts. However, it may pick out a trend that contradicts. Secondly, the empirical basis for a hyperlink between climate change and violent conflict is not well established. A number of studies suggest that climate change viewed in the lenses of scarcity of resources, is reason enough for the eruption of violent clash. Climate change hazards destabilises the natural functioning of a social ecological system which can be a country or particular community in a region.

¹⁹CNA, 'National Security and the Threat of Climate Change' (Security and Climate Change, 2007).

²⁰Sebastian Oberthür, Dennis Taenzler, and Alexander Carius, 'Climate Change and Conflict Prevention: The Relevance for the International Process on Climate Change', *German Federal*

²¹Rafael Reuveyny, 'Climate Change Induced Migration and Violent Conflict', *Political Geography*, no.26 (2007): pp 656-73

²²H Buhaug, N.P Gleditsch, and O.M Theisen, 'Implications of Climate Change for Armed Conflict, World Bank Group: 'Social Dimensions of Climate Change', 2008.

The Global Partnership for the Prevention of Armed Conflict (GPPAC) indicates that climate change- conflict nexus can be analysed and understood in three dimensions; climate change-natural resource scarcity; climate change-induced migration and conflict; climate change – environmental degradation and conflict.²³ It is however very crucial to interrogate how climate change hazards influence human behaviour in terms of the adaptation choices they make. May be not all coping mechanisms lead to conflict.

1.4.2 Climate change and resource scarcity

‘Neo- Malthusians’ scholars, have for many years now been concerned with the impact of rapid population on limited resources holding that the most important of all renewable resources crucial to mankind’s survival are cropland and fresh water. Available scholarly work on climate change and security however puts emphasis on how the two factors interact leading to inadequate resources that cannot satisfy existing needs. Among the most critical elements that are bound to exacerbate the situation are increasing temperatures, reduced precipitation/rainfall and erratic and at times adverse weather phenomenon that would accelerate resource degradation underway²⁴.

In Sub-Saharan Africa, studies by Hendrix and Glaser opine that fertile and productive regions are less susceptible to conflict over resources.²⁵ In regions where pastoral activities are common, like the Horn of Africa for instance, an increase in vegetative cover prompts a

²³Ragnhild Nordås and Nils Peter Gleditsch, ‘Climate Change and Conflict’, *Political Geography* 26, no. 6 (August 2007): pp 627–38.

²⁴Ministry for the Environment, *Nature Conservation and Nuclear Safety (BMU) Climate Change and Conflict*, 2002.

²⁵Hendrix, C. S., & Glaser, S. M. (2007). Trends and triggers: climate, climate change and civil conflict in sub-Saharan Africa. *Political Geography*, 26(6), pp 695, 715.

spike in confrontation over pasture.²⁶ On the other hand, increased rainfall and forage were found to have little impact on conflict occurrence. The impact of rising sea levels is projected to have the most serious impact resource related conflicts as communities currently living in low-lying areas would migrate to other regions (higher grounds) leading to increased competition over limited resources. Reuveny holds that if previous impacts of migration on environmental resources are considered, its effect (conflict) will be most felt in Africa due to its limited migration opportunities. This can lead to inter-ethnic vulnerabilities to conflict as studies in Melanesian countries have found. Indeed, climate change has long been established as one of factors contributing to on-going civil strife in Africa such as the Darfur region of Sudan.

Schwartz and Randall ponder the impact of a climate change induced catastrophe on the United States' (US) national security in a report to the Department of Defence. They assert that aggressive conflicts are likely to occur over food, water and energy as sudden change in climate reduces the world's carrying capacity. They further argue that as the world heaves under such burden, communities may regress back to previous primitive survival mode where frequent and violent conflicts over resources were the norm. Other scholars however caution against playing up the nexus between climate change and conflict though admitting that the degradation, overuse and altered distribution of resources would acerbate possibilities of armed conflicts and environmental disasters.

Utilizing data from the 2007 United Nations Intergovernmental Panel on Climate Change (IGPCC)²⁷, there are three elements that are likely to significantly impact on national

²⁶Meier, P., Bond, D., & Bond, J. (2007). Environmental influences on pastoral conflict in the Horn of Africa. *Political Geography*, 26(6), pp 716, 735.

²⁷IPCC, 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge' (Cambridge, 2007).

security, namely; population displacement, degradation of cropland and increasing freshwater scarcity. Thus Climate change would most probably impact negatively on food production with some areas recording a drop in yields while fewer others experiencing the opposite. Indeed, a slight increase in global temperature is predicted to result in increased food production in temperate regions, any bigger hike will have the extreme negative effect with output dropping significantly. In the tropics however, even slight warming could wipe out the often limited outputs since most areas practise dry land agriculture.

Climate change is also projected to accelerate water and soil degradation further complicating the process of food production. However, proper land use and management together with adaptation behaviour have shown to have potential to mitigate these impacts. IPCC estimates that 1.7 billion people do not have access to sufficient and clean water otherwise called water stress populations. This translates into the use of more than 20% of their renewable water supply. The rapidly expanding population and industrialization is likely to result into greater number of water stressed communities that can only be aggravated by climatic change. This will be manifested in reduced stream flow and even lower ground water level. Increased temperatures are likely to lead to reduced water quality (contamination). During such times, water management would decline as non-climatic factors are also likely to impact freshwater access and quality. Failure to implement effective water management strategies will lead to severe water scarcity.

Climate change is expected to herald unprecedented changes in sea levels. It is projected to cause significant rises especially in low-lying areas of coastal and riverine settlements leading

to migration of affected populations to higher grounds.²⁸ Thus the most dramatic weather phenomena associated with climate change is predicted to interfere with human settlements with gradual rise of sea level which will also cause soil and freshwater degradation. Investing in environmental intelligence; the ability to predict and forecast capabilities, will reduce the problem of population displacements and make adaptation easier. The principal result of change in climate is the 'shortage of assets'. Change in climate may have outcomes for the accessibility of fundamental assets for managed business e.g. soil, nourishment, and water that is fresh. Shortage is characterized as 'low per-capita access to an asset'. Shortage of assets in this manner is low capita accessibility of renewable assets, for example, sustenance, freshwater, and soil. All in all shortage of assets can happen in two ways. Initially, a lessening of assets or diminishing asset base, and secondly, an expansion of interest, brought about by an expanding populace weight or expanding utilization.

As indicated by the IPCC and comparative reviews, the natural effects of environmental change will differ hugely between districts. A few regions, Northern part of Europe included, are probably going to profit by an expansion in normal temperatures as it is relied upon to bring about expanded product yields, expanded timberland development, diminished vitality interest for warming, and decreased mortality from frosty exposure.²⁹ In any case, the IPCC foretell that the world generally won't profit by the change of atmosphere. As indicated by the IPCC, expanding temperatures, changing precipitation designs, general decrease in yearly

²⁸IPCC. (2007). Summary for policymakers, Geneva: intergovernmental panel on climate change. In S. Solomon, et al. (Eds.), *Climate change 2007: The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press.

²⁹IPCC, 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge' (Cambridge, 2007).

precipitation, rising ocean levels, and expanding recurrence of outrageous occasions can prompt to an expansion of shortage of resources.³⁰

There are enormous variations in impacts of climate change experienced by different Zones, according to the IPCC. The weakness and the ability to adjust to new conditions depend exceedingly on relevant attributes. As indicated by the IPCC environmental change will prompt to an ascent of temperatures, an adjustment in precipitation designs, an ascent of the ocean level, and an expansion of major occasions. An ascent of temperatures is required to expand the times of dry seasons. The IPCC foretells that even little neighbourhood hotness increments of 1–2°C will diminish rural yield and increase the danger of starvation. The increase in hotness will definitely surge the demand for clean water and heighten the likelihood of crop failure. The alteration of precipitations is anticipated to lead to a rise of the yearly rainfall and a variation in precipitation natures. The rise of yearly precipitation could be useful for produce making and clean supply of water. The blend with varying examples however is relied upon to prompt to brief times of substantial precipitation and precipitation at startling circumstances.³¹ Horticulture in Bangladesh is exceptionally acclimated to times of storm.

Around 80% of the average yearly precipitation happens amid rainstorm. Agriculturists rely on their insight into precipitation designs for crop cultivation. Brief periods of substantial precipitation and rainfall at unforeseen circumstances can prompt to a disintegration of indigenous information and yield failures. The rise of yearly precipitation and the tiny periods of substantial precipitation can likewise prompt to surges. The ascending of the ocean level can improve saltiness interruption, riverbank disintegration, and beach front disintegration.

³⁰Ibid, 30

³¹Klare, M. T. (2001). The new geography of conflict. *Foreign Affairs*, 80(3), pp 49, 61.

Saltiness intrusion because of ocean level ascent can lessen farming production through inaccessibility of clean water and debasement of horticultural land. Saltiness interruption corrupts quality of soil which lessens production of crops.³² Turkana County is a dry and semi-arid area, water is naturally scarce in the county and extreme weather may lead to drought and thereby worsen the already scarce water situation in the county. At the same time, residents of the county are mostly pastoralists. Extreme weather may thus lead to death of livestock thereby making them scarce. All these consequences are recipe for conflict in Turkana.

1.4.3 Climate Change, natural disasters and conflict

A second outcome of change in climate, or possibly intermediate phase between violent conflict and change in climate, is increasing occurrence of catastrophic natural events. Global warming is projected to increase the rate of recurrence and strength of hurricanes, surges, avalanches, and rapidly spreading fires. The UNDP describes a catastrophe as an event which interferes with the normal working of a community or a society and which leads to extensive social, physical, economic and/or environmental distractions which go beyond the capability of the community or society to handle independently.³³ The description deduces that natural catastrophic events are very likely to result in a momentary failure of domestic national functions. The destruction of road and rail network hinders outside shipments of aid and water, and power sources are interrupted and health centres are highly populated due to increase in numbers of casualties. The inability of the state in these situations to come to the aid of her citizenry can result in uncertainty in the people, political shakiness and violent clashes over the little available resources.

³²Salehyan, I., & Gleditsch, K. S. (2006). Refugees and the spread of civil war. *International Organization*, 60(2), pp335-366

³³UN. (2007). Security Council holds first-ever debate on impact of climate change, 5663rd meeting. New York: United Nations, Department of Public Information.

The 20th century has experienced an upsurge in the rate of recurrence of natural disasters. Nearly all of the progressive recurrence of natural hazards can be attributed to hydro-meteorological factors. Floods make up the most predominant disaster type. A large part of the earth's surface, more than a third of the land and 82% of the population, is to be found in areas predisposed to flooding.³⁴In 2007 the recounted rate of recurrence of natural catastrophic events affirmed the worldwide rise in incidences of natural hazards. This rise can be principally attributed to the upsurge of recounted hydro-meteorological disasters. Hydrological (basically surges) and meteorological (tempests) catastrophes are the real givers to this pattern.

Drury and Olson instituted a reasonable connection amongst catastrophes and political turbulence. In spite of the fact that catastrophes can in rare instances unite the political ruling class in its position, but in most cases, catastrophes have a tendency to elevate disappointment and create uncertainty among the citizenry with the effectiveness of the government in power. In a catastrophe occurrence, governments are frequently rendered powerless and lose their ability to show leadership to the people. Any negligence and ineffectiveness with respect to the government and the leadership is likely to be brutally brought to light amid and after the catastrophe.³⁵ These types of occurrences manifested the progressiveness of clashes in Haiti (1954), Bangladesh (1988, 1974) & East Pakistan (1970).

The momentary collapse of state capacities is taken advantage of by various groups such as looters for personal gain. However, in such circumstances, the danger of armed revolutions by insurgent groups is usually low. Clashes by revolt bunches has also been observed to be

³⁴CNA.(2007). National security and the threat of climate change.Report from a panel of retired senior US military officers. Alexandria, VA: CNA Corporation. <<http://securityandclimate.cna.org/>>.

³⁵Esty, D. C., Goldstone, J. A., Gurr, T. R., Surko, P. T., & Unger, A. N. (1998). State Failure Task Force Report: Phase II Findings. McLean, VA: Science Applications International, for State Failure Task Force.

low since they are similarly experiencing administrative and strategic limitations caused by the catastrophic event. Plundering by and large starts around 48 hours after the genuine fiasco and finishes when state capacities are re-established. Be that as it may, catastrophe-linked collapse of state capacities does not really bring plundering and higher wrongdoing in its wake. There are several reports of an increase in willingness to jointly help each other within the affected community and a reduction in criminal activities.³⁶ Flawed or inaccurate recounts of plundering and brutality can lead to uneven utilization of security forces and punitive handling of supposed wrongdoers. A past event that can be referred to, is the sending of the armed forces in Venezuela (1999), yet security forces were comparatively sent to Bihar (1987), Anhui (1998) and New Orleans (2005). There is no recognised event in which external forces or insurgent groups have abused a natural catastrophic event to mount a conquest³⁷.

1.4.4 Climate Change, political instability and conflict

Social impacts identified with the outcomes of a change in climate, shortage of assets and catastrophic events, could assume an imperative part in current days inter nation – intra nation clashes. The will and capacity of the state to oversee and resolve the issue of struggling for the available little resources is key in figuring out if suppressed clashes intensify to the utilization of violence.³⁸ Violence can largely be attributed to shortage of essential resources. There are a few viewpoints to this. First of all, coping with the outcome of resource scarcity by providing backup accommodations and paying back farmers who lost their crops in the disaster can be expensive for the government. Poor and institutionally weak

³⁶Hegre, H., & Sambanis, N. (2006). Sensitivity analysis of empirical results on civil war onset. *Journal of Conflict Resolution*, 50(4), pp508,535.

³⁷Salehyan, I., & Gleditsch, K. S. (2006). Refugees and the spread of civil war. *International Organization*, 60(2), pp35-36.

³⁸Brochmann, M., & Gleditsch, N. P. (2006). Shared rivers and international cooperation. Paper presented at the workshop on polarization and conflict. Nicosia, Cyprus. Available from www.prio.no/files/file47722_cyprus_paper_mb-npg_final.doc.

administrations may basically not have the capacity to react in a way that is gratifying for the citizenry. Secondly, reactions to catastrophic events may influence the redistributive limit of governments and take away capital and attention from other imperative projects, like security, education, infrastructure and health. Governments may likewise try to take advantage of the hostile environmental situation by using social groups against each other for example, the youth, ethnic groups. It has been contended that such 'state abuse' conduct is typical for a few present-day resource clashes.³⁹ A destabilised state may likewise offer ascent to opportunistic contenders who are not experiencing the ill effects of exacerbated environmental conditions. Lastly, elections in political structures that have little or no practice of representative governance is viewed with high levels of doubt and there is even a greater risk of eruption of violence. Public strain caused by among other issues climate-related dilapidation, are expected to be evident in terms of movements against the government during the electioneering period.⁴⁰

There is considerable observational proof for an association between political instability and augmented possibility of violent conflict. The latest extensive empirical assessment of suggested factors that may prompt conflict in the quantitative literature found political unsteadiness to be among the moderately few strong links of civil war.⁴¹ The availability of strong and powerful statistical connection between political unsteadiness and violent conflict ensures that any organizational significance of climate change for the category and effectiveness of state institutions (e.g. loss of public support due to poor or lack of development in economy) is very probable to have an unforeseen effect on the risk of violent conflict.

³⁹Klein, L. R., Lo, F. C., &McKibbin, W. J. (Eds.). (1995). Arms reduction: Economic implications in the post cold war era. Tokyo, Japan: United Nations University Press.

⁴⁰Hegre, H., &Sambanis, N. (2006).Sensitivity analysis of empirical results on civil war onset.Journal of Conflict Resolution, 50(4), pp508,535.

⁴¹Ibid, 508-9

1.4.5 Climate Change led economic instability and conflict

Economic hardship under certain circumstances can in a big way increase the risk of violent conflict. Prolonged dry spells, unreliable rainfall, poor land use and desertification all have serious effects on livelihoods in the Horn of Africa. The economy in this region largely depends on rain-fed agriculture and pastoralism. When the rains fail, a big population are at risk of starvation and their livelihood is thrown in the balance. When sudden environmental changes such as prolonged droughts or floods occur, violence is likely to become a survival option as people do not have time to adapt or build peaceful resource-sharing mechanisms.

A subsequent societal effect identified with the results of environmental alteration that can bring about fierce clash is economic precariousness. Sustenance, water, and soil instability influence the source of revenue directly. This can bring about poverty at a personal level and also at a national level. Poverty (regularly calculated as little per capita salary) has for quite some time been viewed as a noteworthy reason for civil war.⁴²

Political market analysts more often than not ascribe the poverty-conflict relationship to variables that increases people's predisposition to criminal conduct in respect to standard economic activity.⁴³ Along this line of thought, inability to easily earn income through legally accepted means as well as food shortage more generally makes it easier for people to join insurgent groups out of need for satisfaction of basic needs and looking for what they believe is good governance. In areas where the community depended on agriculture as their source of

⁴²Collier, P., Elliott, L., Hegre, H., Hoeffler, A., Reynal-Querol, M., & Sambanis, N. (2003). *Breaking the conflict trap. Civil war and development policy*. Oxford: Oxford University Press.

⁴³Gleditsch, N. P., Furlong, K., Hegre, H., Lacina, B., & Owen, T. (2006). Conflicts over shared rivers: resource scarcity or fuzzy boundaries? *Political Geography*, 25(4), pp 361,382.

livelihood, devastation of farmlands makes people lose their source of livelihoods and creates a larger pool of initiates into the insurgent groups which results in higher conflict possibility. Changes in climate has contributed to more regular dry spells, floods, tropical hurricanes, and dilapidation of agricultural land, events which cause decline in the yields from farming as compared to joining criminal and guerrilla groups.⁴⁴ Furthermore, loss of livelihoods may lead to migration which encompasses a different unforeseen probability for population strain, competition for available inadequate resources and recruitment to insurgent groups.⁴⁵ In the case where the citizens have low or lack income, the capacity of the nation to effectively govern is weakened. Consequently, the high number of civil wars in developing countries can be attributed to the availability of good conditions which favour uprisings such as lack of or poor means of handling uprisings when they occur, inadequate infrastructure and poor governance. Additionally, low economic growth lowers people's support for the ruling government.

When the economy is growing at a very low rate, there is an increase in the resourcefulness gap between the economically rich and the poor countries. The poor countries with many competing needs have less to spend on coping mechanisms and are less prepared to respond to cases of natural disaster such as floods and dilapidated infrastructure.⁴⁶ In a case where climate change causes an increase in poverty and extensive loss of income then it is more probable that it will have a great negative outcome on hopes for long-lasting peace.

⁴⁴Meier, P., Bond, D., & Bond, J. (2007). Environmental influences on pastoral conflict in the Horn of Africa. *Political Geography*, 26(6), pp716,735.

⁴⁵Raleigh, C., & Urdal, H. (2007). Climate change, environmental degradation and armed conflict. *Political Geography*, 26(6), pp 674, 694

⁴⁶ Homer-Dixon, T. F. (2007). Terror in the weather forecast. *New York Times*, 24 April.

1.4.6 Climate Change induced migration and conflict

Migration occurs in areas considered to have more resources. When people move from one place to another, there is high likelihood of violent conflict over the available resources which often are not enough for both the locals and the migrants. This is a very common occurrence in Africa and especially among the pastoralist communities. When people can no longer sustain themselves, they often respond by moving to areas where there are more resources available. Migration is an adaptation strategy. However groups migrating to a particular area do face challenges such as lack of common value systems and varied cultural orientations. Further the groups may lack common conflict resolution mechanisms and thus resort to violence when competing for resources. Group identity comes to play as a survival strategy and stronger groups rally their community to fight for resources such as water, food and pasture. The decision to migrate can be caused by a number of factors that are not limited to environmental changes alone. Social-economic and political factors also play an important role in influencing migration. However migration-induced conflict have been witnessed where resources are considered abundant and living conditions more conducive than where the migrants have come from.⁴⁷

Analogy borrowed from economic framework that illustrates options available to buyers faced with declining product quality; consumers may stop buying the product (exit), consume while calling for improvement of quality (voice) or do nothing (loyalty). Faced by adverse climate change, the populace may opt to exit, voice or stay.⁴⁸ Migration can be manifested in varied ways; it can be quick or progressive, and it can also be long-lasting or momentary. The type of relocation relies upon the type of the danger. For instances people are likely to be

⁴⁷Gleditsch, N. P., Furlong, K., Hegre, H., Lacina, B., & Owen, T. (2006). Conflicts over shared rivers: resource scarcity or fuzzy boundaries? *Political Geography*, 25(4), pp 361,382.

⁴⁸Reuveny, R. (2007). Climate change-induced migration and violent conflict. *Political Geography*, 26(6), pp 656-673.

temporarily displaced by sudden modification from natural disasters. Migrants can also be grouped into those who move only to a short distance where they deem safe and will come back when situations change and those who travel long distances and settle down in the safe, developed areas.

Migration caused by climate change can lead to violent conflict in the areas where the people are migrating to through three corresponding ways. Firstly, the immigrants are more likely to cause competition over the few available resources especially if issues such as land rights are underdeveloped. Secondly, immigrants of a different ethnic group from the host population can cause ethnic tension and solidification of identity. Finally, a huge flow of migrants may lead to uncertainty between the sending and host nation.

The greater Northern Africa is a conflict ravaged region in Africa. The region has had many inter-nations as well as intra-nation armed clashes during the post-independence era. The horn of Africa countries consists of eight nations, including Eritrea, Djibouti, Kenya, Ethiopia, Kenya, Somalia, Uganda, Southern Sudan and Sudan which composes the Inter-governmental Authority for Development (IGAD).⁴⁹Even though interconnected, the contentions in the region happen at numerous levels, including war within the nation and wars between nations, civil battles and clashes; and clashes between communities collective. The conflicts are mainly over the possession and use of natural resources which are either scarce or in plenty. These include arable and grazing land, water, forests, minerals and oil.

⁴⁹ Kidane Mengisteab, *Critical Factors in the Horn of Africa's Raging Conflicts* (Uppsala: Nordiska Afrikainstitutet, 2011).

1.5 Gaps in the literature

According to the foregoing literature, change in climate will encompass massive effects on human race and can cause brutal clash. Horn of Africa in general and Turkana in particular is vulnerable in terms of change in climate. The intention of this research project is to analyse the impacts of climate change and resource scarcity on violent struggle in the context of Turkana County. While it is apparent that economic and political instability can lead to violent conflict, there is no direct link of the same to climate change.⁵⁰ Many scholars draw direct link to violent conflict with poor governance, exclusion and plunder of resources which breeds discontent among the majority poor. The interplay of climate change in enhancing conflicts is lacking from the reviewed literature. There is no known study indicating that perennial conflict in Turkana County is directly linked to the impacts of climate change. Knowledge into the link between climate change and violent conflict in Turkana County may lay a basis for the provision of solutions to address potential related conflicts. Understanding the foundation and root of contention makes the chance to avert social factors that can prompt violent conflict. The present study therefore endeavours to fill the gaps by exploring the role climate change plays in enhancing the selected factors that may exacerbate violent strife in the Turkana County and suggesting possible coping mechanisms to enhance mitigation against impacts of climate change.

⁵⁰Hendrix and Salehyan, 'International Studies Association Annual Conference 2007'.

1.6 Hypotheses of the Study

H1: Climate change has led to resource scarcity in the Horn of Africa as well as Turkana County.

H2: Resource scarcity has led to violent conflict in the Horn of Africa as well as Turkana County.

1.7 Justification of the Study

There is a lot written about the conflict in the Horn of Africa in respect to resource scarcity, but there is not much written about the influence of climate change on these conflicts. The research questions gave an insight in the establishment of one of the most significant principles and explained why it is vital to examine the connection between the variables under review. As such the findings of this study are imperative for future analyses not only at regional and at national levels, but also at the global level. This research seeks to add value to the range of information on the climate change related conflicts and can be used as reference for academic purposes. Further, the study has highlighted ways in which regional powers may influence peace processes in conflicting countries. The findings of this study are of significance to policy makers to help recognize the role of change in climate in enhancing conflict and as such come up with policies that can control the hazardous outcome of human activities on climate change. Policies that seek to address coping mechanisms and provide conflict resolutions are also informed by the findings of this study. While violent conflict among pastoralist communities has been treated by most governments as routine theft of cattle and struggle for resources, this study invites policy makers to address the root causes of the conflicts which are embedded on climate change.

1.8 Theoretical Framework

The study was guided by Environmental Resource Scarcity Theory. The theory was proposed by Homer-Dixon. The proponents of the theory believe that the interplay of decrease in quantity and quality of renewable resources, unequal resource access and increase in population increases scarcity. As a result, there is reduction in economic productivity for the local groups as well as the larger national economies. Due to the scarcity, the affected population may opt to migrate to new lands. Often as groups migrate, they trigger conflict with the host communities.⁵¹

The theory assumes that resource scarcity results from environmental hazards that lead to inadequate supply, high demand or an unequal distribution of a resource that forces some sector of a society into a condition of deprivation and violence. The scarcities are as a result of population growth, economic development, pollution and climate change. What this reveals is that environmental resource scarcity constrains economic and agricultural productivity. This induces poverty, disruption of economic livelihoods and migration. Migration will then be occasioned by unliveable environment quality, potential of the economic livelihood of the migrants becoming better in places with greater resources availability. Migration and constrained productivity will exacerbate prevailing cleavages in a society and in turn cause conflict.⁵² While the theory has been used to examine the relationship between violence and climate change, it would be better if the relationship was examined from environmental justice viewpoint. This is because the type of violence that arise from climate change is structural in nature that is informed by the processes.

⁵¹Homer-Dixon, T.F &Blitt, J. (1998) *Ecoviolence: Links among Environment, Population and Security*. Lanham: Rowman and Littlefield.

⁵²Gleditsch, N.P. &Urdal, H. 2002 "Ecoviolence? Links between Population Growth, Environmental Scarcity and Violent Conflict" *Journal of International Affairs* 56 (1).

The notion that scarcity of resources and environmental degradation contribute to violent conflict have faced criticism from the time it emerged. The criticisms first revolved around the methodology adopted by the researcher. De Soysa contends that the environmentally induced conflict discourse has reached a theoretical point. From an ecologist perspective, Dalby comes to the same conclusion. The resource scarcity theory has some consistency in terms of theory and methodology and the whole concept of environmentally induced conflict substantially fails to empirically convince. However, resource scarcity theory is largely applicable to the conditions experienced in Turkana County in terms of environmental resource scarcity and incidences of violent conflict.

The livelihood of the people of Turkana is nomadic in nature; migration is therefore accustomed in their culture. In the context of Turkana, the resource scarcity theory helped in the examination of the relationship of the four scarcities and conflict. The study under the guidance of the theory focused on quantifiable environmental problems, notably environmental scarcity - farmland, water, grassland, and fish to establish their influence to conflict in Turkana County. The four mentioned environmental resources, farmland, water, grassland, and fish are vulnerable to sudden climatic changes. Due to change in climate, the region experiences food inadequacy and lack of clean water both for human and animal use. Crop land, grazing land and forests have been eaten up by drought thus heightening stiff competition of these environmental resources and triggering conflict.

1.9 Research Methodology

The research methodology adopted in this study explained the research design, study area and study population, data collection, sampling and analysis.

1.9.1 Research Design

This study was conducted through mix method hence the research benefited from both textual information that was obtained from existing literature and interviews from key persons that included security practitioners, climate change practitioners, research scholars and cultural analysts. The focus here was to examine and establish interrelationship among variables and to draw explanatory inferences. In this study, the researcher sought to establish the relationship between climate change and resource scarcity in Turkana County and violent conflict.

1.9.2 Study Area and Study Population

The study focused on dynamics evolving over the Turkana County in Northern Kenya. The area covers an area of 71,597.80 Sq Km.⁵³ Land surface covers 64,782.3 sq km while water surface is 6,805.5 sq km⁵⁴ and has a population of 855,399 according to 2009 national census of which 14.2 are found in urban centres. The county has five sub county administrative centres namely: Lodwar, Lokichar, Lokori, Lokitaung and Kakuma.

1.9.3 Data Collection

Primary and Secondary methods were used for data collection. The study adopted secondary sources by looking at data that is already in existence which include Online content, journal materials, security and policy materials, academic books, and Newspaper articles. The advantage of this method lay in looking at material that is already available, while its major weakness lay in the fact that very little targeted research has been conducted in the realm of relating variability of climate to violent conflict in Turkana County. The study employed Primary data to fill in this gap through making use of expert interviews with individuals who hold theoretical and practical knowledge on quantifiable environmental problems, notably environmental scarcity - farmland, water, grassland, and fish to establish their influence to conflict in Turkana County. The study targeted fifteen key informants distributed across climate research, security, and academia and non-governmental organizations.

⁵³Infotrackea. (n.d.). *Turkana County*. Retrieved July 28, 2017, from infotrackea: <http://www.infotrackea.co.ke/services/leadership/countyinfo.php?cinf=constituencies&t=23>

⁵⁴Turkana County Government. (n.d.). *Turkana Facts and Figures* . Retrieved July 28, 2017, from Turkana County Government: <http://www.turkana.go.ke/index.php/facts-figures/>

1.9.4 Sampling

Respondents for this study were purposively sampled with three primary strands; the first sought to identify and select experts with active research background on climate change in the horn of Africa and its relationship to security. Access to these researchers was achieved through cataloguing research papers from online databases. The second strand targeted researchers who have expert background on handling administrative and security issues in Turkana County; their input assisted the study to validate the assumptions of conceptual elements in our theoretical framework. The Final strand focused on discussions with security and non-governmental personnel deployed in Turkana County who are familiar with the outbreak violence and it's pairing with climate variability and resource scarcity through their active practice, experience or observation. While this study was not statistically representative, the sampling strategy assisted us to access individuals who are closely acquainted with the type of information and knowledge that we sought to use.

1.9.5 Data Analysis

The secondary data was analysed through content analysis, while interviews and discussions were transcribed and qualitatively analysed to draw explanatory patterns and generalize the assumptions that underpin this case study.

1.9.6 Ethical Approach

All research processes require an ethical approach in order to ensure the best chance that the integrity of the research is upheld. In regard to this research project, ethical considerations were guided by the University of Nairobi code of conduct for research. The researcher obtained research permit from National Commission for Science Technology and Information (NACOSTI). The researcher upheld confidentiality and all other ethical considerations to respondents of the study. The also researcher adhered to objectivity, honesty and integrity at all times during the study.

1.9.7 Scope and Limitation of Study

This research project was mainly geared towards analysing the impacts of change in climate on violent conflict in the Horn of Africa. Particularly, the research examined the impact of natural disasters on violent clash, the outcome of inadequacy of resources on violent conflict and the outcome of economic instability on violent clash. It is very difficult to discuss all climate change and violent conflict issues; hence it mainly focused on the aforesaid aspects. Further, the study only focused on Turkana and not the whole of the Horn of Africa region. The study faced a number of limitations, the time allocation of the research project being a constraint given the geographical nature of the study area. Furthermore, the research required a collection of a wide range of published and unpublished resources. These tasks demanded visiting several organization and search websites that consumed significant amount of time, in addition to the time required for data analysis. The researchers' limited experience was another significant constraint.

2.0 Chapter Outline

Chapter one is the introduction to the study. It includes the background of the study, the statement of research problem, research objectives, literature review, theory, basis of the research, hypothetical framework, procedures, and sources of data collection and arrangement of chapters. Chapter two covers climate change and environmental resource scarcity in the Horn of Africa. Chapter three discusses climate change, resource scarcity and violent conflict in Turkana County, Kenya. Chapter four covers climate change governance in the Horn of Africa. Chapter five presents the summary of the key findings, conclusion and recommendations of this study.

CHAPTER TWO

CLIMATE CHANGE AND ENVIRONMENTAL RESOURCE SCARCITY IN THE HORN OF AFRICA

2.1 Introduction

The phenomenon of climate change ecologically poses a wide range of social and economic test on a global scale.⁵⁵ It can be increased through actions by human beings, irresponsible use of land, extreme loggings and too much use of fossil fuels.⁵⁶ Climate change is nowadays a heated topic of discussion in many meetings and conventions worldwide. A lot of emphasis is given to its impact during development plan of any project undertaken by world and regional organizations. Climate change results in fierce storms, prolonged droughts and repeated floods.⁵⁷

Clashes have been occurring in various places between herders and farmers because of reduction in their land for cultivation. Climate effects have caused some countries in the Horn Africa region experience serious conflicts. Some of the countries affected by these conflicts are Sudan, Ethiopia and Kenya .Clashes in this region have always been as a result of cattle rustling , fight for scarce water resource etc. A new emerging conflict factor has been a result of climate change. Despite ‘The horn of Africa region’ not producing much of the global greenhouse gases, it suffers most violent clashes because of climate change. Increase in energy consumption contributes to global warming. Energy being an important resource, most developing countries are most likely going to boost their energy use thus this demand for energy will have repercussions for the region as it tries to reduce the effects of climate change. As governments endeavour to reduce energy by slashing on carbon

⁵⁵ Stern, N. (2006). The economics of climate change. Stern review. London: HM Treasury. . (in book form, Cambridge University Press, 2007).

⁵⁶UN. (2007). Security Council holds first-ever debate on impact of climate change, 5663rd meeting. New York: United Nations, Department of Public Information.

⁵⁷Norda's, R., &Gleditsch, N. P. (2005).Climate conflict e common sense or nonsense? Paper presented at the international workshop on Human Security and Climate Change. Holmen Fjordhotell, Asker, 21-23 June. Available from www.cicero.uio.no/humsec

emissions in the Horn of Africa; this will make reduction of poverty difficult and fuel more political instability and clashes. Climate has been listed among factors that cause conflicts in the world today and not just an environmental issue.⁵⁸

Most Countries in the Horn Africa are very poor and are getting a lot of challenges in reduction of carbon emission. Through their effort of trying to reduce carbon emission these countries may cause internal conflicts in the communities especially when they try to increase forest cover in places where extreme deforestation has occurred. The highest number of malnourished people are found in the 'The horn of Africa' with about 70% of the people in terrible need of food assistance. The state continues to worsen as the harsh climate continues to change. ⁵⁹Conflicts arise when inhabitants are pushed out of their habitation because of hostile weather. The erratic nature of the weather pattern has caused a series of droughts appearing at unpredictable periods. Both human beings and animals have suffered destruction because of this phenomenon. There has been extreme deforestation resulting in the reduction of the animal habitat leading the animals to expand their territories by moving to human settlements thus causing 'Human –Wildlife Conflict'

The East African region has contributed very little to the factors that have led to change in climate though the impact of climate change has been more intense owing to lack of adaptation capability and poor institutions. The bad effects of climate change are already affecting most of the communities living in this region especially the pastoral communities. There is a great shift in agricultural method of farming, prolonged droughts, change in weather patterns and serious floods which are some of the effects of climate change. In Somaliland; a semi-autonomous region in the horn of Africa, frequent prolonged droughts, increased loss of biodiversity, increased informal settlement in urban areas, eruption of crop

⁵⁸Schwartz, P., & Randall, D. (2003). An abrupt climate change scenario and its implications for United States National Security. Washington, DC: Environmental Media Services. .

⁵⁹Renner, M. (1996). Fighting for survival. Environmental decline, social conflict, the new age of insecurity. New York and London: Norton, for Worldwatch Institute.

pests and human diseases and loss of soil fertility have been some of the negative impacts brought about by climate.

2.2 Climate Change and Security

Security is a multifaceted concept that has various dimensions. Security debates can thus be approached from any of the many dimensions, but most dominant dimension in security discourse is the national referent with particular attention to violent conflict. The question in the minds of policy makers is how to develop capacity to effectively respond to potential violent conflict.⁶⁰ While climate change is the focus of the present study, it must be noted that consideration of alternative referent objects including humans has attracted the attention of policy makers with little attention paid to climate change.⁶¹

Climate change-security discourse can be traced to Falk, in whose book ‘This Endangered Planet’⁶² highlighted what he described as the first law of ecological politics. Falk opined that the availability of time for people to adapt to environmental changes inversely affects the probability and depth of conflict, psychological impacts and the physical adjustments that normally accompany the process of adaptation.⁶³ Falks’ contention is a maxim for modern day climate change research that believes that depending on the rate of climate change, adaptation time is affected, and in the event that the ability of adapting is hampered, the impact of climate change will be adverse. While contributing to the national security discourse, Lester Brown’s *Redefining National Security*⁶⁴ was instrumental in defining the nexus between climate change and security. The contributions of redefining National Security had a bias to

⁶⁰UNDP (United Nations Development Program), 1998. Human Development Report 1998. Oxford University Press, Oxford and New York.

⁶¹van Ireland, E., Klaassen, M., Nierop, T., van der Wusten, H., 1996. Climate change: socio-economic impacts and violent conflict. Dutch National Research Programme on Global Air Pollution and Climate Change, Report No. 410 200 006, Wageningen.

⁶² Falk, R., 1971. *This Endangered Planet: Prospects and Proposals for Human Survival*. Random House, New York.

⁶³ Ibid

⁶⁴ Brown, L., 1977. *Redefining national security*. Worldwatch Paper No.14, Worldwatch, Washington.

food security.⁶⁵ He argued that, regardless on a country's military capability, the challenges posed by climate change cannot be met by armed forces. He thus suggested that effective policy response to these challenges would include disarmament and budgetary reallocations. On the same vein Wilson contended that solutions to climate change would not emanate from military responses and nation-centred realpolitik but from policies geared towards the reduction of the impacts of climate change.

2.3 Climate Change and Food Security

Climate change has been mentioned as one of the factors that lead to food insecurity in the Horn of Africa. According to Food and Agriculture Organization, food insecurity exists when individuals, households, national, regional and global levels are deprived of active and healthy lives due to lack of access to adequate, secure and nutritious food to meet their dietary needs⁶⁶. The lack of access is either physical or economical depending on the prevailing circumstances. The impact of climate change varies between countries in this region. For example there is a decline in the Agricultural yields in Ethiopia due to the effects of drought which has reduced the arable land. Food scarcity usually results in deadly conflicts as pastoralist search for grazing fields and human beings migrating to fertile areas in search of farming lands. The scarcity of water has led to reduction in agricultural produce and food distributing agencies making camp in the horn of Africa. Climate change is generating desert-like environments in Sudan, Somalia, Ethiopia, Eritrea and Kenya and also destroying beaches which include mangrove forests and also causing the reduction of fish resources.

⁶⁵Murdiyaso, D., 2000. Adaptation to climatic variability and change: Asian perspectives on agriculture and food security. *Environmental Monitoring and Assessment* 61 (1), 123–131; Sanchez, P., 2000. Linking climate change research with food security and poverty reduction in the tropics. *Agriculture, Ecosystems & Environment* 82 (1–3), pp371–383.

⁶⁶Food and Agriculture Organization (2003) *Trade Reforms and Food Security: Conceptualizing the Linkages*. Rome: FAO.

The Horn of Africa experiences food insecurity due to various interlocking factors. These include loss of biodiversity, poverty, drought, poor land use such as land fragmentation, protracted violent conflicts, surging population growth and low development in the agricultural sector. Some of these factors can be linked to climate change⁶⁷. Rainfall and temperature variability directly affects food production and in most parts of the developing countries, such food is cultivated locally. Crop growth and development is limited by water shortage and heat stress thus reducing expected yield⁶⁸. While examining the factors causing food insecurity in the Horn of Africa, it is evident that climate change related phenomena such as droughts play a major role. However, the people in this region remain vulnerable with low adaptive capacity due to endless violent conflicts, poor land use and more so, unchecked population growth thus leading to environmental degradation. Rainfall declines and erratic weather may thus tip households over the edge into livelihood crises. A study by Burke and colleagues examined the role that climate change has had on the risk and the effect of historical violent conflicts. The study found that the anticipated food security lapse in Africa is real and confirmed what has been stated by the 2010-2012 journals by the food state of affairs in the Horn of Africa. The results for this project reveal a gloomy situation for food security due to climate change.

⁶⁷Funk CC, Dettinger MD, Michaelsen JC, Verdin JP, Brown ME, Barlow M, Hoell A (2008) Warming of the Indian Ocean threatens eastern and southern African food security but could be mitigated by agricultural development. *Proc Nat Acad Sci USA*, 105:11081– 11086

⁶⁸Prasad PVV, Staggenborg SA (2008) Impacts of drought and/or heat stress on physiological, developmental, growth, and yield processes of crop plants. In: Ajuha LR, Reddy VR, Saseendran SA, Yu Q (eds) *Response of crops to limited water: understanding and modeling water stress effects on plant growth processes*. American Society of Agronomy/ Crop Science Society of America / Soil Science Society of America, Madison, WI, p 301–356

2.4 Climate Change and Low Economic Growth

The Horn of Africa has been considered to be the region that will mostly suffer the impacts of climate change due to their fragile economies which largely depend on rain fed agriculture⁶⁹. It is evident that reliance on rain-fed agriculture for sustainable economic growth in light of rainfall variability and diminishing water sources is disastrous. Rain-fed agriculture is limited and cannot produce enough food to feed an expanding population. Further, there is a growing competing needs for water owing to industrial expansion and the rapid growth of urban populations.⁷⁰ Agricultural activity largely depends on biodiversity and ecosystems and therefore highly sensitive to climate change. Agricultural activities including pastoralism is influenced by availability of adequate water sources, fertile soil, favourable weather conditions and a balanced ecosystem. However, climate change due to human interventions has led to loss of biodiversity. Human activities such as uncontrolled mining, clearance of vegetation cover for farming and pasture and excessive use of fertilizers and pesticides have resulted in soil degradation. In natural circumstances, the ecosystem is supposed to replete itself, however with the advent of climate change, the capacity to adapt naturally to changes has been severely weakened.⁷¹

Another economic sector likely to suffer due to climate change is tourism. Even though it is not clear how the Horn of Africa will experience decline in tourism income, the World Tourism Organisation have indicated that in Northern Africa, a decrease may occur in ultimate summer tourism while the winter season is likely to attract more visits thus altering the traditional tourism pattern. This will definitely be a climate change implication for the tourism industry in this region. In sub-Saharan Africa, climate change will obviously affect

⁶⁹Biswas, A. K. (Ed.). (1994). International waters of the Middle East: From Euphrates-Tigris to Nile. Oxford: Oxford University Press.

⁷⁰Fischer, G., Shah, M. and van Velthuisen, H., Climate Change and Agricultural Vulnerability, International Institute for Applied Systems Analysis, Austria, 2002.

⁷¹B. Harvey, J Ensor et al, CCAFS, 2012.

the tourism industry due to its impact on animal migrations and breeding. Game viewing sites are likely to change as animals and birds migrate from their traditional habitats due to extreme temperatures and lack of food and water.⁷² Tourism is very vital to the economy of many African countries. Actually it's only second to agriculture and therefore loss of biodiversity caused by climate change could adversely affect this industry.

2.5 Climate Change and violent Conflict

Many studies have predicted that the Horn of Africa will experience a 54 per cent increase in armed clashes by 2030 more than the 1980 -2000 period. Climate related armed conflict is rated amongst the highest in the world. It has been linked to droughts which have made life very difficult for pastoralists in the arid and semi-arid regions. For example pastoralists and farmers in the Oromia and Ogaden regions of Ethiopia often clash over the key resources. Somalia also has witnessed inter clan fighting over the same while there has been an increase of drought related clashes in northern Kenya which borders some of the clash prone areas in the horn of Africa. All these conflicts point to the connection that exists between climate change and its impacts of violent conflict. Pastoral communities living in the drought prone semi-arid and arid areas of Northern Kenya, Ethiopia and Southern Sudan have clashed time and again over pasture land, water and livestock. The clashes have been made worse by proliferation of small arms that threatens the security architecture of the whole region.⁷³

Violent conflict is widespread in the Horn of Africa due to the political feebleness of many states even though at the moment it is only happening at communal level. The Horn of Africa and Central Africa regions are very notorious when it comes to cases of internal conflict.

⁷² Mendelsohn, R. Morrison, W. Schesinger, M. and Andronova N. Country-specific market impacts of climate change. Crga.atmos.uiuc.edu/publications/market_impact/text.html, 2007

⁷³ CNA.(2007). National security and the threat of climate change.Report from a panel of retired senior US military officers. Alexandria, VA: CNA Corporation. .

There has been a considerable escalation of violence in these areas as a repercussion of the growing challenges of climate change. There are many other causes of violence in the Horn of Africa as mentioned earlier but that is not our main agenda. Violent conflict brought about by climate change definitely is. Policy makers have been burning the midnight oil looking for solutions on how to handle after effects of conflicts. For instance Somalia has been at war for decades now and thousands of its citizens have died. It is reported that only 3 percent of its total land area is arable. This country will suffer greatly if mitigation measures are not seriously handled against climate change.

The Horn of Africa is having great pressure on the scarce farming land, serious risk of increasing desertification, water scarcity and food shortages affecting great geographical areas caused by change in climate. As earlier mentioned, there has been an extended conflict in the Orgaden and Oromia region of Ethiopia which has caused great human suffering and fatalities due to the impact of erratic change of weather patterns caused by climate change.⁷⁴ Ethiopia and Somalia are located in arid and semi-arid areas. These countries have been increasing their food production as their population increases. A lot of pressure is being put in the agricultural sector of these states which has been fuelling tensions between herders and farmers who fight for the reducing resources caused by climate change.

The Horn Africa is part of the wider African continent always referred to as the troubled continent.⁷⁵ Most countries in this region have very weak institutions and often fight over the dwindling resources and fair distribution of the same. This region has been at the centre of most devastating clashes of late due to the effects of climate change. The violent nature of

⁷⁴Gleick, P. H. (1993). Water and conflict: fresh water resources and international security. *International Security*, 18(1), 79-112.

⁷⁵Hauge, W., & Ellingsen, T. (1998). Beyond environmental scarcity: causal pathways to conflict. *Journal of Peace Research*, 35(3), 299-317

this phenomenon brings out a variety of opportunities and risks to aid agencies who always strive to manage and conserve the environment which could be both a seed of violence and the foundation for peace and prosperity. The population of Africa is ever growing and rapidly modernizing. This will lead to a growing demand in diverse resources and the impact of climate change will accelerate.⁷⁶

There is a great danger in the Horn of Africa especially in Southern Ethiopia where there have been frequent droughts, key resource scarcity and land related conflicts as a result of climate change. As other developing nations in the region, this country has a weak government and limited economic resources which fuel conflict and political instability. The sea level has been rising and glaciers have been melting on Africa's highest mountains of Kilimanjaro and Kenya. This happens because of global warming caused by climate change. These events together with the excessive weather occurrences caused by climate change will result in strange environment situations which will develop into conflict.⁷⁷ Climate change has induced extreme weather conditions at alarming rate beyond the coping capacity of this region. Rising sea levels and melting glaciers are likely to create new environmental conditions that would lead to conflict. African countries in this region therefore need to take immediate action to ensure that their economic growth index and human livelihoods are not compromised by the detrimental effects of climate change.

⁷⁶ Ibid, 316

⁷⁷ Kennedy, D., Holloway, D., Weinthal, E., Falcon, W., Ehrlich, P., & Naylor, R., et al. (1998). Environmental quality and regional conflict. New York: Carnegie Commission on Preventing Deadly Conflict. .

2.6 Environmental resource scarcity and conflict

Research has indicated that there is a strong historical link between civil war and climate change induced environmental resource scarcity.⁷⁸ The livelihood of many people will suffer as it has been predicted due to the change in climate. The weak community might resort to violence and take arms against stronger communities when they feel marginalized and excluded from vital resources like arable land and water. War has ravaged Africa for a long time because global leaders have failed to agree on how to control climate change. There have been serious conflicts between farmers and herders in parts of Sudan, Kenya, Somalia and Southern Ethiopia which amplifies how the impact of climate change increases the risk of violence.

This impact is also being witnessed on output of agricultural crops. Crops like maize, wheat and cowpeas have been showing strong negative effects in their growth in Eastern Africa. Arable land and crop growing seasons continue to diminish in the arid and semi-arid regions. The horn of Africa region is thus likely to suffer decreasing crop yields which would lead to food insecurity and escalate violence.⁷⁹ It is projected that rain-fed agriculture will go down by up to fifty percent come the year 2020. Africa mostly relies on this method as a source of water for its crops. Climate change has reduced rainfall in this area to a certain extent that for a period of consecutive years there has been sharp reduction in farm yields. The Horn of Africa countries of Somalia, Ethiopia, and Eritrea have experienced fatalities estimated at over six hundred thousand in the last century due to prolonged damaging drought. The above mentioned three countries have oftenly also experienced internal and regional conflict. The greatest threats to the regions security has been drought and famine.

⁷⁸Hauge, W., & Ellingsen, T. (1998). Beyond environmental scarcity: causal pathways to conflict. *Journal of Peace Research*, 35(3), 299-31

⁷⁹Ibid

The greatest challenge for the countries in this region is how to mitigate and adapt to climate change. According to Burke and colleagues⁸⁰, by the year 2080, climate change will lead to desertification and increase arid lands under water stress. There is going to be a loss of 50million to 90million hectares of farm land and arid areas would expand from 5% to 8%. A report by IPCC ⁸¹ suggests that Africa does not still understand the repercussions of climate change on food situation especially when other factors are taken into consideration. The body has projected that this situation would make many people homeless. Already about 24 percent of the population in Sudan are displaced and they live in makeshift shelters with no source of reliable income. The living conditions are poor and insecure.

The Horn of Africa has a long history of drought, and it is said that in excess of forty-two droughts has ravaged the area since 1980. It is projected that dry lands will expand from 3 percent to 8 percent by the year 2080 due to climate change. The population is in danger of violence because of the effect of climate on their livelihoods and their land. The intervals by which drought has been occurring has significantly altered in a way that instead of appearing once in eight years, it is now being witnessed once in every two to three years.⁸²

While exploring the link between climate change and security, if one was to depend on the available literature, caution needs to be taken. The Northern theoretical and strategic interests have been the major drivers of the debate rather than heuristic evidence.⁸³ The difficulty in finding evident determinants of violent conflict may be accounted by the lack of scientific data. On the basis of available evidence on environment-conflict research, only speculative

⁸⁰Burke et L. R., Lo, F. C., &McKibbin, W. J. (Eds.). (1995). Arms reduction: Economic implications in the post-cold war era. Tokyo, Japan: United Nations University Press.

⁸¹IPCC, 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge' (Cambridge, 2007).

⁸² Climate Change, Gender Inequality And Migration In East Africa Medhanit A. Abebe, 2014

⁸³ Barnett, J., 2000. Destabilising the environment-conflict thesis. *Review of International Studies* 26 (2), pp 271–288; Gleditsch, N., 2001. Armed conflict and the environment. In: Diehl, P., Gleditsch, N. (Eds.), *Environmental Conflict*. Westview Press, Boulder, CO, pp. 251–272.

claims rather than certainty on the effect of climate change on conflict exits. There is therefore need for more studies that involve other interacting factors that may cause conflict as is suggested by Baechler.⁸⁴

Accounts by the World Resources Institute (WRI) suggests that by the year 2050 world population may exceed nine billion and economic industrial development likely to quadruple.⁸⁵ Pressure on renewable resources is thus likely to increase due to these developments. These assertions are supported by other scholars including Homer-Dixon who opine that environmental decay will worsen in the future.⁸⁶ The question is, how will the society react to resource scarcities occasioned by climate change? Developed world is likely to react by applying rationing policies, or invest in research and development with an aim of producing or substituting scarce resources. In less developed countries, natural resources scarcity is more severe. Scarcity of resources is thus likely to prompt violent conflict.⁸⁷

While the impetus to studying the impacts of climate change in the society has grown since mid-1990s, scarcity of resources has been at the centre stage of this debate. Capriciousness of rainfall results in severe weather such as floods and drought and is likely to lead to reduction of renewable resources.⁸⁸ Channels through which resource scarcity may prompt violent conflict have been suggested by environmental security literature. Literature suggests that resource scarcity will change the political stability of underdeveloped states and make

⁸⁴Baechler, Günter. 1999. *Violence Through Environmental Discrimination: Causes, Rwanda Arena, and Conflict Model*. London: Kluwer Academic Publishing.

⁸⁵Maxwell, J. and Reuveny R. 2000, *Resource Scarcity and Conflict in Developing Countries*

⁸⁶Homer-Dixon, T. F., & Percival, V. (1996). *Environmental scarcity and conflict: Briefing book*. Toronto: AAAS.

⁸⁷Ibid,

⁸⁸ Boko M, Niang I, Nyong A, Vogel C, Githeko A, Medany M, Osman-Elasha B, Tabo R and Yanda P. 2007. *Africa. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Parry M L, Canziani O F, Palutikof J P, van der Linden P J and Hanson C E (eds). Cambridge University Press. Cambridge UK. pp. 433 – 467.

political violence more probable.⁸⁹ Scarcities of essential resources such as water or arable land have a potential of violent conflict along three possible pathways. The first pathway may involve economic decline or quality of natural resources which may lead to violent conflict due to shrinking natural resource base.⁹⁰

Competition over scarce resources and worsening living situations breed frustration and a sense of dispossession. Violent conflict is likely when elites in the society try to shift distribution of resources in their favour.⁹¹ Homer-Dixon in his work on scarcity induced environmental conflict describes this scenario as resource capture. He opines that environmental scarcity encourages groups that control political and economic power to capture vital environmental resources for themselves thus alienating the marginalized groups who have no option but to either move to less resourceful areas or stage resistance for survival. Sudden deviations in rainfall patterns may lead to poor harvest and/or grazing land shortage which weaken economic activities that heavily depend on agriculture. Sub-Saharan Africa heavily relies on rain-fed agriculture for her economic growth and food sustainability. The agricultural sector also employs the majority of labour force.⁹² Violent conflict may be prompted with loss of livelihood and reduction of employment opportunity in the sector that supports the economy.⁹³ The second pathway is through weakness of political institutions. Scarcity of resources may lead citizens to lose confidence in their government prompting violent conflict and weakening the institutions further. The third channel relates to migration of people fleeing from uninhabitable places. As persons seek resources to replace the

⁸⁹Baechler, G. (1999). *Violence through environmental discrimination*. Dordrecht, Netherlands: Kluwer; Homer-Dixon, T. F. (1999). *Environment, scarcity, and violence*. Princeton: Princeton University Press.

⁹⁰ Homer-Dixon, T. F. (1999). *Environment, scarcity, and violence*. Princeton: Princeton University Press.

⁹¹ Homer-Dixon, T. F. (1999). *Environment, scarcity, and violence*. Princeton: Princeton University Press; Kibreab, G. (1994). *Migration, environment and refugeehood*. In B. Zaba, & J. Clarke (Eds.), *Environment and population*

change (pp. 115-130). Liege, Belgium: Ordina.

⁹² Stern, Nicholas, 2007: *The Economics of Climate Change: The Stern Review* (Cambridge: Cambridge University Press).

⁹³ Miguel, Edward, ShankerSatyanath, and Ernest Sergenti. 2004. "Economic Shocks and Civil Conflict: An Instrumental Variables Approach." *Journal of Political Economy* 112 (4): pp725-753.

depleted resources, conflict may arise between natives and immigrants. Immigration may also undermine the receiving community's capacity to provide adequate basic needs such as shelter and food thereby increasing the potential for deprived groups to mobilize for violence. This condition is also ripe for political radicalization and violence.⁹⁴

Literature suggests that the relationship between environmental strains and violent conflict is indirect. It depends on other variables like poverty and institutional weaknesses that hamper the state from adapting to such strains through innovation means.⁹⁵ Developing countries bare the greatest brunt of environmental strains. Sub-Saharan economies in particular heavily depend on rain fed agriculture. Shortage of rainfall for example has a direct relationship with agricultural output; in turn, the tax bases of these economies will reduce. In addition, shortage or lack of rainfall further complicates the issue as it reduces the ability of these countries to deal with violent conflicts.⁹⁶

A numbers of violent conflicts in the Horn of Africa can be traced to environmental strains.⁹⁷ The challenge in these cases is the lack of empirical base to support the notion that environmental scarcity may be the causal factor of violent conflict.⁹⁸ Mixed findings have been reported by systematic and comparative research examining the empirical validity of the identified mechanisms for a link between climate and conflict.⁹⁹ One of the most inclusive study exploring the relationship between drought and the onset of intra-state conflict was

⁹⁴ Homer-Dixon , Thomas . 1999 .Environment, Scarcity, and Violence. Princeton, NJ : Princeton University Press; Reuveny , Rafael . 2007 .“ Climate change-induced migration and violent conflict . ” Political Geography 26(6): pp656 – 673 .

⁹⁵ Homer-Dixon , Thomas . 1999 .Environment, Scarcity, and Violence. Princeton, NJ : Princeton University Press; Kahl, Colin, 2006: States, Scarcity, and Civil Strife in the Developing World (Princeton, NJ: Princeton University Press).

⁹⁶Kahl, Colin, 2006: States, Scarcity, and Civil Strife in the Developing World (Princeton, NJ: Princeton University Press); Homer-Dixon, Thomas, 1999: Environment, Scarcity and Violence (Princeton, NJ: Princeton University Press).

⁹⁷Kahl, Colin, 2006: States, Scarcity, and Civil Strife in the Developing World (Princeton, NJ: Princeton University Press); Baechler, Günther, 1999: Violence through Environmental Discrimination (Dordrecht: Kluwer).

⁹⁸Gleditsch, KristianSkrede, 2007: “Transnational Dimensions of Civil War”, in: Journal of Peace Research, 44,3 (May):pp 293–309

⁹⁹Gleditsch, Nils Petter, 2008: “The Liberal Moment Fifteen Years On”, in: International Studies Quarterly, 52,4 (December): pp691–712

done by Theisen, Holtermann, and Buhaug.¹⁰⁰ The findings of their study supported the Oslo Group position. It did not reveal any relationship between drought and violent conflict. Other studies however suggest the existence of a relationship between climate strains and intra-state conflict.¹⁰¹ Buhaug, questions the robustness of these findings.¹⁰² Some studies that explored the link between land and water resources have suggested that political and economic variables account for civil war and not environmental reasons.¹⁰³

Literature suggests that strains on certain basic resources such as arable land have the potential of heightening inter-group tensions and the subsequent conflict between these groups.¹⁰⁴ Such inter-group conflict takes advantage of tribal ties, religious and ethnic affiliations to rally and mobilize for support. Most land related conflicts in the Horn of Africa, is usually between farmers and pastoralists. This is mainly because of the difference of the livelihood requirements of these groups. One group relies on land for crops while the other for grazing. The hand of climate change is seen in the subsequent conflicts through its role for instance on determination of rainfall levels that influence the availability of water. Arable cropland and pasture depends on water availability and are key to the survival of both farmers and herders. Drought may lead to expansion of desert to previously arable land and in turn lower the productivity of the affected land. When it rains excessively, there is danger of flooding, landslides and soil erosion that can adversely affect the economy.¹⁰⁵ In 2001 for instance, long rains led to the busting of the Shebelle River which in turn flooded large

¹⁰⁰Theisen, Ole Magnus, 2008: "Blood and Soil? Resource Scarcity and Internal Armed Conflict Revisited", in: *Journal of Peace Research*, 45,6 (November): 801–818.

¹⁰¹Miguel, Edward, Shanker Satyanath, and Ernest Sergenti. 2004. "Economic Shocks and Civil Conflict: An Instrumental Variables Approach." *Journal of Political Economy* 112 (4): 725-753;

¹⁰²Buhaug, Halvard, 2010: "Climate not to blame for African Civil Wars", in: *Proceedings of the National Academy of Sciences of the USA*, 107,38 (September): 16477–16482.

¹⁰³ Hendrix, Cullen S.; Glaser, Sarah M., 2007: "Trends and Triggers: Climate, Climate Change and Civil Conflict in Sub-Saharan Africa", in: *Political Geography*, 26,6 (August): 695–715.

¹⁰⁴Ibid, 696

¹⁰⁵Tarhule A (2005a) Damaging rainfall and flooding: the other Sahel hazards. *Climate Change* 72:355–377

portions of farmland in the Middle Shebelle region of Somalia.¹⁰⁶ Fights erupted in the region between clans that were competing over grazing land. The Shebelle region incident is a clear demonstration of how scarcity of resources can be occasioned by abnormal rainfall, and how scarcity of resources can lead to violent conflicts as is suggested by Homer-Dixon and others. In the Horn of Africa, conflict among pastoral groups mostly stems from competition over grazing land and access to water.¹⁰⁷ This was also the case in Ethiopia when clashes erupted between the Issa who are farmers and Afar who are pastoralists in the 1990s. These groups clashed over water holes culminating into a full blown conflict in 2002.

Environmentally induced hardships will easily lead to communal conflict than rebellion against the state.¹⁰⁸ While communal conflict is highly likely, the state is the easiest target in the event of environmentally induced hardships.¹⁰⁹ The use of violence to access basic essentials such as land, targeting the state would only be significant if the state was unable to offer short term remedies to the underlying problems.¹¹⁰ Such conflicts are usually effective to the groups especially when small groups are targeted than if small groups were to rebel against the state. The fact that groups would opt to fight against other groups, the state needs to be responsive to environmental hardships as the small tensions cumulatively become a challenge to the state.

Research on environment as a source of intra-state conflict is hindered by lack of data, and basing studies on previous research in this field has equally not been successful because the

¹⁰⁶ IRIN (2007) Global: More extreme weather in poorer countries. Integrated Regional Information Networks, December 11. Available via <http://www.irinnews.org/report.aspx?ReportID=75810>

¹⁰⁷ Meier, Patrick; Bond, Doug; Bond, Joe, 2007: "Environmental Influences on Pastoral Conflict in the Horn of Africa", in: *Political Geography*, 26,6 (August): pp716–735.

¹⁰⁸ Buhaug, Halvard; Gleditsch, Nils Petter; Theisen, Ole Magnus, 2010: "Implications of Climate Change for Armed Conflict", in: Mearns, Robin; Norton, Andrew (Eds.)

¹⁰⁹ Hendrix, Cullen S.; Glaser, Sarah M., 2007: "Trends and Triggers: Climate, Climate Change and Civil Conflict in Sub-Saharan Africa", in: *Political Geography*, 26,6 (August): pp695–715.

¹¹⁰ Raleigh, Clionadh; Jordan, Lisa, 2010: "Climate Change and Migration: Emerging Patterns in the Developing World", in: Mearns, Robin; Norton, Andrew (Eds.): *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World* (Washington, DC: The World Bank): 103–131; Hendrix, Cullen S.; Glaser, Sarah M., 2007: "Trends and Triggers: Climate, Climate Change and Civil Conflict in Sub-Saharan Africa", in: *Political Geography*, 26,6 (August):pp 695–715.

studies are limited in scope.¹¹¹ An exceptional study by Melander and Sundberg that relied on data collected from the sub-African region between 1989 and 2004 concluded that unless in the case of extreme levels of soil-degradation there is no evidence to link soil degradation and inter group violent. These findings are echoed by those of Hendrix and Salehyan¹¹² who found that in Africa, countries with rainfall variability, whether positive or negative have a higher risk of low intensity political tumult, such as riots.

The reviewed literature do not reveal a causal link between the environment and organised violence, instead they suggests the significance of mediating variables such as economic and political structures. Violent conflict has been found to be directly related to the extent of vulnerability which is determined by the level of exposure and resilience.¹¹³ The criticism that environmental scarcity linkage that is cited by many scholars is that the existing accounts are state centric and that they are silent on the contribution of local configurations of political power and wealth and how these shape the vulnerability of communities.¹¹⁴ Further criticism to the environmental security literature relates to their underestimation of the ability the local people have to engage in negotiation and adaptation or innovation to solve conflicts. The literature seem to deny any role for existing local agencies in non-violent conflict resolution. Lack of alternative coping strategies when faced with environmental strains lead communities to violent conflict. Conflict however has high cost. Economic vulnerabilities and political marginalisation are factors which interact with physical exposure to push the

¹¹¹ Meier, Patrick; Bond, Doug; Bond, Joe, 2007: "Environmental Influences on Pastoral Conflict in the Horn of Africa", in: *Political Geography*, 26,6 (August): 716–735; Raleigh, Clionadh, 2010: "Political Marginalization, Climate Change, and Conflict in African Sahel States", in: *International Studies Review*, 12,1 (March): pp69–86

¹¹² Salehyan, Idean, 2008: "From Climate Change to Conflict? No Consensus Yet", in: *Journal of Peace Research*, 45,3 (May), pp315–326.

¹¹³ Schwartz, Daniel M.; Deligiannis, Tom; Homer-Dixon, Thomas, 2001: "The Environment and Violent Conflict", in: Diehl, Paul F.; Gleditsch, Nils Petter (Eds.): *Environmental Conflict* (Boulder, CO: Westview): pp273–295.

¹¹⁴ Raleigh, Clionadh; Jordan, Lisa, 2010: "Climate Change and Migration: Emerging Patterns in the Developing World", in: Mearns, Robin; Norton, Andrew (Eds.): *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World* (Washington, DC: The World Bank): pp103–131.

local communities to violence. It is therefore important to take these factors into consideration in order to curb violence in the face of environmental strain.

The situation in the Horn of Africa matches the illustration above. Environmental hardships are experienced mostly by the poor communities such as the pastoralists. They are economically vulnerable and hence occupy physically marginalised arid and semi-arid regions that are more likely to suffer in case to natural disasters such as flooding and severe drought. The choice of resorting to violence when faced by environmentally induced hardships by group is highly influenced by poverty. When groups feel deprived, they become frustrated and aggressive and thus act as a basis for radicalization against other communities.¹¹⁵ The resort to violence is more palatable to poor people because they have lower opportunity costs for the option of violence; that is they have nothing to lose.¹¹⁶ Social status equally influences the poor's ability to endure adverse changes in environment. This is partly because poverty reduces the available options to communities in addressing economic consequences of anomalies in climate. Among the contributing factors for the vulnerability of the poor in the event of erratic rainfall are reliance on single source of income, limited accumulated assets, restricted access to economic markets and uncertain land tenure.

The ability of the poor to cope with the adverse effects of environmental scarcity is further exacerbated by uncertain land tenure and community's economic power because they cannot afford the cost of available coping strategies in the face of climatic difficulties that involve rationing, sale of assets, commodity trading, inter-household transfers and loans, dispersed grazing, relief aid and use of credit. Research indicates that the poor are not the only once

¹¹⁵Gurr, Ted Robert, 2000: *People versus States. Minorities at Risk in the New Century* (Washington, DC: United States Institute of Peace Press); Østby, Gudrun; Tadjoeeddin, Zulfan; Urdal, Henrik; Murshed, S. Mansoob; Strand, Håvard, 2011: "Population Pressure, Horizontal Inequalities and Political Violence: A Disaggregated Study of Indonesian Provinces, 1990– 2003", in: *Journal of Development Studies* 47,3: pp377–398.

¹¹⁶ Collier, Paul; Hoeffler, Anke, 2004: "Greed and Grievance in Civil War", in: *Oxford Economic Papers*, 56,4 (October): pp563–596.

affected by environmental anomalies. They are however most vulnerable because they are compelled to dispose their possessions that secure their income at distress times, a situation that worsens their marginalisation. Feeling of deprivation can either be relative or absolute, relative deprivation is when a people feel they are getting less than they deserve, while absolute is when there is a divergence between what people get and what they need. The feeling of deprivation and marginalisation among populations experiencing environmental hardships will be strengthened by unequal access to services offered by the state at the local level, access to basic infrastructure and other safety nets thus enhancing the risk of violent conflict.¹¹⁷

2.7 Environmental resource scarcity, political marginalization and conflict

Political standing is also very salient in informing populace resilience to environmental hardship. Politics is organised around ethnic or religious affiliations in Africa. Resources distributions thus tend to follow ethnic line.¹¹⁸ Studies have revealed that when groups are excluded from power on ethnic grounds then the groups are highly likely to be involved in organised violence.¹¹⁹ When groups are politically excluded, the range of response options is limited to the groups if they were facing environmental hardships. The potential for political exclusion leading to organised violence can be through two different pathways.¹²⁰ First, marginalized regions where communities who the state regard as politically irrelevant do have minimal government presence. As such few resources are available. Such regions lack

¹¹⁷Ostby, Gudrun; Tadjoeeddin, Zulfan; Urdal, Henrik; Murshed, S. Mansoob; Strand, Håvard, 2011: "Population Pressure, Horizontal Inequalities and Political Violence: A Disaggregated Study of Indonesian Provinces, 1990–2003", in: *Journal of Development Studies* 47,3: pp377– 398.

¹¹⁸ Busby, Joshua; Smith, Todd G.; White, Kaiba; Strange, Shawn M., 2010: "The Sources of Climate Insecurity: Mapping Vulnerability in Africa",

¹¹⁹Cederman, L.E.; Girardin, Luc, 2007: "Beyond Fractionalization: Mapping Ethnicity onto Nationalist Insurgencies", in: *American Political Science Review*, 101,1 (February): 173–185; Theisen, Ole Magnus; Holtermann, Helge; Buhaug, Halvard, 2010: "Drought, Political Exclusion, and Civil War", October

¹²⁰ Raleigh, Clionadh; Jordan, Lisa, 2010: "Climate Change and Migration: Emerging Patterns in the Developing World", in: Mearns, Robin; Norton, Andrew (Eds.): *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World* (Washington, DC: The World Bank): pp103–131.

physical infrastructure, public services, and adequate state governance tools that could help in peaceful conflict resolution between groups in the face of scarcity induced violent conflicts. Raleigh¹²¹ points out that in such areas where the government presence is low, groups mobilize and use violence to access vital resources for sustainability.

The second pathway relates to the social status of a group. Depending on the social status, a regime will either react effectively or ineffectively in times of environmental hardships. A politically correct group will receive a quick and effective response in times of for instance drought or adverse rainfall by means of disaster relief. Administrations may invest in infrastructure to reduce future effect of such disasters; and compensation policies may be put in place to address the menace. All these potential government responses and more are not likely to be advanced to peripheral groups in times of environmental hardships because the government feels less threatened by any reaction that they may have. State's response thus exacerbates the vulnerability of the peripheral groups making them more prone to sustained poverty, migration and even intra-group violence in response to hardships. A case in point is a conflict that erupted in marginalised region of Sudan between two ethnic groups; the Reizegat and the Habaniya. The tribes had a chronic tension over grazing land which grew into a violent conflict in 2006 claiming about 150 persons.¹²² State action or reaction in the face of environmental hardships reduces the potential of violent conflict among the affected regardless of the victims' status in the society. Economic or political exposes communities to hostile effects of drought, excess rainfall and other environmental hazards. This exposure enhances the competition over scarce resources among the affected communities; a complexion that may easily result into violent conflict.

¹²¹ Raleigh, Clionadh; Kniveton, Dominic, 2010: "Chronic Communal Conflict and Environmental Pressures", Paper presented at the Climate Change and Security Conference Trondheim, Norway, 21-24 June 2010.

¹²² United Nations Environment Programme (UNEP), 22008: Vital Water Graphics. An Overview of the State of the World's Fresh and Marine Waters (Nairobi, Kenya: United Nations Environment Programme)

2.8 Climate related Institutions in Africa

Climate change programmes in Africa are geared towards attainment of development goals and especially where such undertakings are meant to reduce poverty levels among the poor in the society. Most countries in Africa have developed national adaptation programmes supported by international multilateral processes that incorporates other stake holders such as development partners and international institution that offer funding and support towards full implementation of adaptation strategies by least developed countries in Africa¹²³. In recent years, the continent has developed institutions and programmes to enable it have a common position on climate change issues and confront the impacts of climate change and future challenges at all levels. Some of these institutions are briefly mentioned in the following paragraphs.

2.8.1 The African Climate Centres

The four main climate related centers in Africa are the African Centre for Meteorological Applications for Development (ACMAD), the Agro-meteorology and Hydrology Regional Centre (AGRHYMET), IGAD Climate Prediction and Application Centre (ICPAC) and SADC Climate Prediction Centre. These centers mainly serve as WMO Regional Climate Centers (RCCs) for Africa for down scaling of products from WMO Global Producing Centers (GPCs) in the developing regional specific areas. The products include

2.8.2 The African Ministerial Conference on the Environment (AMCEN).

The African Ministerial Conference on the Environment is a permanent forum where African ministers of the environment discuss mainly matters of relevance to the environment of the continent. AMCEN was established in 1985 when African ministers met in Egypt and adopted the Cairo Programme for African co-operation. It picked momentum in 2009. The Conference is convened every second year. Its main objectives are to(i) Implement the

¹²³African Climate Policy Centre (ACPC), 2010. Overview of the ClimDev Africa Programme. Available at: <http://www.climdev-africa.org/afrian-climate-policy-center>

continent's process to achieve a common negotiations position on a comprehensive international climate change regime (ii) Provide a platform to deliberate and agree on a shared vision and common position for Africa to combat climate change and achieve sustainable development in the continent; (iii) Engage with the rest of the international community in finding solutions to address challenges posed by climate change ; and (iv) Develop a comprehensive framework of African climate change programmes and its associated sub-regional climate change programmes with the view to, among others, informing the negotiations process¹²⁴.

2.9 Chapter Summary

Resource scarcity is a major cause of violent conflict within the Horn of Africa region. Among other factors, climate change is seen as the main contributor to diminishing environmental resources. As a result, economic decline and conflict has been witnessed in nearly all the countries in the Horn. Lack of proper structures to deal with impacts of climate change in combination with other intervening factors such as political marginalization, poverty and weak governance, has made the region vulnerable to climate related hazards and conflict. Conflicts have been occurring in various places between herders and farmers because of reduction in their land for cultivation and lack of pasture and water. Some of the countries affected by these conflicts are Sudan, Ethiopia, Somalia and Kenya .Clashes in this region have always taken the form of cattle rustling, invasion of croplands and fight for scarce water and food resources. Despite the Horn of Africa region not producing much of the global greenhouse gases, it suffers most violent clashes because of climate change. Climate change has been listed among factors that cause conflicts in the world today and not

¹²⁴AMCEN (2011): Addressing Climate Change Challenges in Africa; A Practical Guide Towards Sustainable Development.

just an environmental issue.¹²⁵ Climate related institutions or initiatives in Africa are not fully implemented due to overreliance on donor funding. Developed countries have many a times failed to own their obligations to support developing countries implement programmes meant to improve mitigation and adaptive capacity to climate change.¹²⁶

¹²⁵Schwartz, P., & Randall, D. (2003). An abrupt climate change scenario and its implications for United States National Security. Washington, DC: Environmental Media Services. .

¹²⁶Boko M., Niang, I., Nyong, A., Vogel, C., Githeko, A., Medany, M., Osman-Elasha, B., Tabo, R., and Yanda, P., (2007): Africa. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge UK, 433-467.

CHAPTER THREE

CLIMATE CHANGE AND VIOLENT CONFLICT IN TURKANA COUNTY: AN ANALYSIS

3.1 Introduction

Turkana County is situated in Northwest Kenya on the north of the equator and it borders Uganda to the Northwest, South Sudan to the North and Ethiopia to the Northeast. Within Kenya, it neighbours four counties namely West Pokot, Baringo, Samburu and Marsabit. Turkana County has a land mass of 68,680 km², 99% of which is arid and semi-arid. There is very little erratic rainfall experienced in this region. A whole year records only an average of less than 6 inches.¹²⁷ The average temperature is 30.5⁰C with a range of 20⁰ to 40⁰C. The only available permanent water bodies are Lake Turkana in the east and Turkwel River in the west. Fresh water for domestic use is a challenge as well as water for livestock. The community rely on water from ponds, water holes, and rock pools that are temporary and only available following some rain.

Lake Turkana found in the eastern side of the county is very rich with fish and wildlife. Lake Turkana gets its water from Omo River which flows from the Ethiopian highlands. There is reason to worry about the future of Lake Turkana if irrigation and hydropower generation activities by Ethiopian government in Omo River are left unchecked. It will not only reduce the economic value of Lake Turkana but also make extinct some fish and animal species that are found here.¹²⁸ Despite these environmental setbacks, Turkana County is still regarded as cradle for humanity according to archaeological records. It remains a major tourist and research site renowned all over the world. Understanding the impacts of climate change in

¹²⁷Republic of Kenya, 2014

¹²⁸Noy, Ilan (2009) The macroeconomic consequences of disasters. *Journal of Development Economics* 88(2): pp221–231.

this region is therefore important in devising ways to preserve the rich history and develop adaptive measure to mitigate against violent conflict experienced by the people living here.

3.2 Fragility of Turkana County

The Horn of Africa region is considered as one of the most severely climate change challenged regions.¹²⁹ The respondents were of the opinion that it is ironical though that Africa produces negligible greenhouse emissions that are responsible for global warming and yet scientific projection indicate it would be the most severely affected. The region comprises of Ethiopia, Eritrea, Djibouti, Sudan, South Sudan, Uganda, Somalia and Kenya. As noted earlier, since their independence, all of the Horn of Africa has at one time been embroiled in inter-state conflict, internal uprisings and/or both.¹³⁰ Thus, the Horn of Africa region of which Turkana County is part of; is home to communities characterized by fragile ethnic and religious relations and is considered particularly susceptible to the eruption of new conflicts caused or acerbated by climate change. This has widely been attributed to a lack of/inadequate sustainable development capacity, including an effective climate change coping mechanism that can compromise peace and security.¹³¹

Climate change in the Turkana County is manifested and associated with harmful environmental changes such as severe droughts, the fast expanding arid conditions (desertification), declining amounts of rainfall, abnormally high temperature, prevalence in devastating storms and flash floods, and loss of eco-sensitive diversity; findings that are consistent with the views of Swain and colleagues.¹³² The result of these conditions are socio-economic and political hardships such as famine, loss of livestock, increased cases of

¹²⁹World Bank (2010) World Development Indicators. Washington, DC:World Bank (<http://data.worldbank.org/data-catalog>).

¹³⁰UNSD (2010) United Nations Statistical Database (<http://unstats.un.org/unsd/databases.htm>).

¹³¹Leroy, M., and Gebresenbet, F., 2011

¹³² Swain, A., Swain, R.B., Themnér, A. and Krampe, F. 2011; Cohen, J., Horne, F. and Rall, K., 2015)

poverty and poor health among others. In this case, violent conflict occurs when elements of climatic change cause the depletion or scarcity of a renewable resource such as water and land, leading to competition both within and from outside the community that more often leads to armed violence. This can aptly be captured in the perennial situation where climate change induced drought results in competition over water and pasture among pastoral communities in and around Turkana County that has resulted in perennial conflicts to the extent that it is at times mischaracterized as ‘the pastoral way of life’.¹³³ It is significant to appreciate that violent conflict in this region like elsewhere in the Horn of Africa is not entirely attributable to adverse effects of climate change. Interviews opined that the Turkana region and indeed all pastoral regions of Africa have been a theatre for serious conflicts since time immemorial even though the causes and protagonists in the conflicts have changed over the years.

3.3 Manifestations of climate change in Turkana County

The Turkana people live and rely on their animals and the environment. However, the changing climate has made life very difficult. With less rain, the rivers and lake that provide water for their animals and domestic use continue getting drier and shallower. Watering holes that have served people for ages are fast disappearing due to prolonged droughts which have also resulted in death of animals and severe famine. As a pastoralist community, land has cultural and social importance. Land is believed to belong to the community and passed on from generation to generation. However, climate change is denying them this very important asset through degradation that is occurring at an alarming rate. The people are getting worried about the future. Further, regional development projects such as damming and irrigation along River Omo in Ethiopia are threatening the health and livelihood of Turkana people¹³⁴.

¹³³Cohen, J., Horne, F. and Rall, K., 2015)

¹³⁴ICRC (International Committee of the Red Cross) (2010). Livestock Study in the greater horn of Africa – Kenya Country Profile.

Another aspect influenced by climate change is migration. Typically migration has been used as a coping strategy to harsh weather by the Turkana. Herders move their animals to areas considered resource plenty in a bid to protect them from eventual death due to lack of pasture and water. While this traditional practice was tenable some years back, it is no longer reliable due to erratic rainfall and prolonged droughts.

Conflict over grazing land is a common occurrence with deadly consequences. Food scarcity and diseases are hazards that the Turkana people have to contend with because of change in climate¹³⁵. The phenomenon of Climate change has been in effect for a long time in Africa at large and Turkana in particular. While the evidence of climate change is mostly manifested in floods and droughts, it has become more severe and sharply increasing in Turkana. Weathermen have forecast that climate change is not about to end soon. As such the Horn of Africa in general and Turkana in particular will remain fragile in regard to the dependency on rain for pastoralism and sedentary agriculture. The conditions in Turkana are a manifestation of problems experienced in the wider region.

3.4 Climate Change and conflict

The study sought to establish the views of the respondents on the possibility of climate change causing violent conflict in Turkana. It was revealed that climate change can lead to violent conflicts in various ways. In an interview, a discussant said that, *“we the Turkana people are majorly pastoralist, we value our livestock so much, if anything was to interfere with our livestock then there would be possibility of conflict. As pastoralists, we move from place to place in search of grazing land for our livestock in times of drought. That has been*

¹³⁵Thornton PK, Jones P G, Owiyo T, Kruska R L, Herrero M, Kristjanson P, Notenbaert A, Bekele N and Omolo A, with contributions from Orindi V, Ochieng A, Otiende B, Bhadwal S, Anantram K, Nair S, Kumar V and Kelkar U (2006). Mapping climate vulnerability and poverty in Africa. Report to the Department for International Development, ILRI, Nairobi, Kenya, May 2006, 200 pp.

our lifestyle for the longest time I can recall. However, lately, the droughts stay for longer times than before; in fact, even where we used to move for graze land also experience the same drought, our livestock thus have to scramble for the little available graze land. As a result possibilities of conflict are on the rise because you can't let somebody graze on your land when you also need the same for your livestock"¹³⁶. These sentiments were shared by other discussants too. It emerged that generally, the feeling across board was that climate change through many agencies like slow economic growth, scarcity of resources among others could lead to violence. This position is supported by the findings of a number of scholars whose studies revealed a causal relationship between disasters, economic growth and armed conflict.¹³⁷ On the same note, another respondent to this study said, *"We have witnessed a lot of communal tensions over water, and I think suffice is to say that climate change may cause communal conflict. In the bid to look for water for livestock and domestic use, the Turkana and Pokot community fight over grazing land and water for livestock*"¹³⁸. While the general opinion among the respondents was that climate change may lead to violence, there were sentiments that suggested the contrary. It emerged that prolonged drought which is a consequent of climate change does not cause violence. It was indicated that Turkana is generally a Semi-Arid region that is characterised by dryness in the longer periods in a year and the residents have coping mechanisms to such climate.

It was revealed that high temperatures, inadequate rainfall and drought in Turkana has led to a reduction of water level in Lake Turkana and River Tarkwel which are the major source of water in this region. Subsequently this has affected the people livelihood. Moreover, the salinity of the water in Lake Turkana will increase due to reduction of freshwater flow from

¹³⁶Ouda. Interview with Lokore, Community Social worker, Lodwar, July 2017.

¹³⁷Collier, Paul & Anke Hoeffler (2004) Greed and grievance in civil war. *Oxford Economic Papers* 56(4): 563–596; Fearon, James D & David D Laitin (2003) Ethnicity, insurgency, and civil war. *American Political Science Review* 97(1): 75–90; Hegre, Håvard & Nicholas Sambanis (2006) Sensitivity analysis of the empirical literature on civil war onset. *Journal of Conflict Resolution* 50(4): 508–535.

¹³⁸Ouda. Interview with Erupe, Security Officer, Lokichar, July 2017.

river Omo. Tensions emerge because of scarcity of fresh water and as communities scabble for the little fresh water.

3.5 Climate Change and Cattle Rustling

During the study, it clearly emerged that the major cause of insecurity and violent conflict in this region is the old cultural practice of cattle rustling between the Turkana community and their neighbours, especially the Pokot. Traditionally, among the Turkana and the Pokot, cattle raiding was an accepted practice sanctioned by the elders. It was viewed more or less as a sport and cattle changed hands from one group to another without bloody encounters, loss of life and destruction of property. However, this has changed drastically due to various overreaching factors which include the impacts of climate change. Drought exacerbates cattle rustling as individuals migrate from one part of the county to the other in search of pasture. The study also revealed that conflict in Turkana are less during droughts but more in wet seasons as communities have plenty pasture and thus yearn for more stock to restock herd lost during drought. Communities also raid for cultural reasons such as acquiring livestock for dowry, and having large stocks as a show of wealth¹³⁹.

Mwaniki et al¹⁴⁰ posit that the main source of conflict in the Northern region of Kenya are linked to scarcity of resources, lack of economic development, political instability, proliferation of small arms and ethnic rivalries. This study found out that the first layer of factors contributing to violent conflict in this region is climate change induced scarcity of resources. Shrinking of resource base leads to a desperate struggle for survival which introduces the use of sophisticated weapons by communities to protect their livestock and

¹³⁹Ebei P., Oba G. (2007). "Kiyoto atang'aa - step aside I open": Ethno-Oral narratives of droughts of Turkana pastoralists.

¹⁴⁰Mwaniki, T.W., Mbuchi, P.M., Leleruk and Mwei, F. (2007): Peace Building and Conflict Management: Joint Case Study of North Rift Region of Kenya: Koble Press (Limuru)

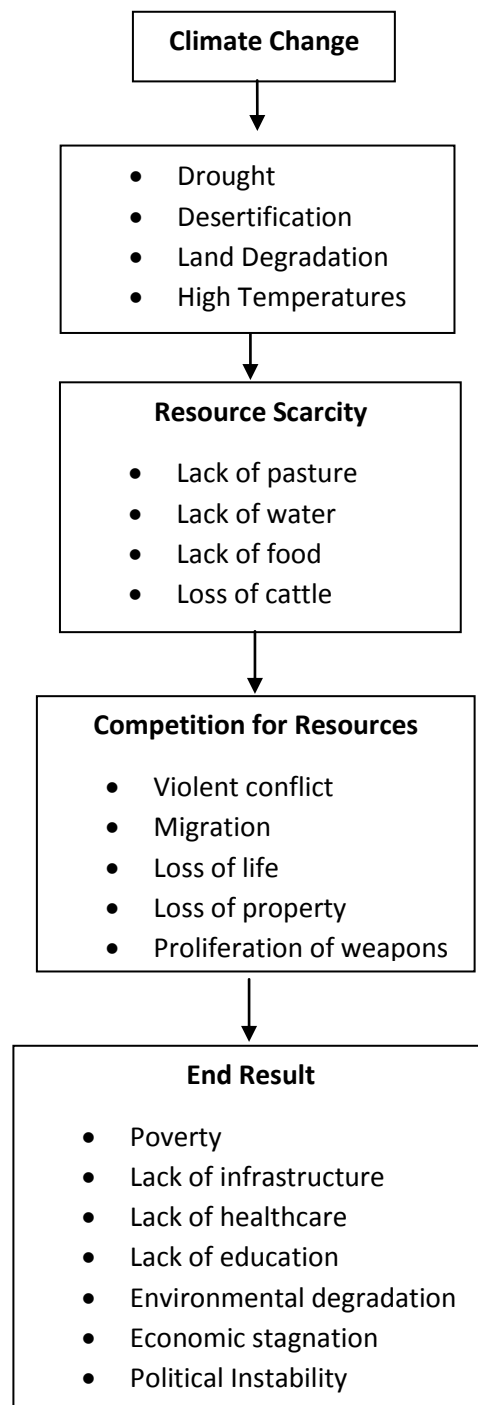
defend their grazing areas¹⁴¹. The study also found that over time, the Turkana pastoralists have lost access to pasture due to changing climatic conditions and also to alternative land use by other people. Opiyo et al¹⁴² assert that scarcity of pasture and water remains a major threat to pastoral economy in northern Kenya which makes conflict inevitable.

The diagram below explains the nexus between climate change and problems experienced by the Turkana community as revealed by this study.

¹⁴¹Meier, P., Bond, D. and Bond, J. (2007) Environmental Influences on Pastoral Conflict in the Horn of Africa. *Political Geography*, 26(6), pp. 716–735.

¹⁴²Shilling, Opiyo & Scheffran, op. cit

Fig 1.0 : Nexus between climate change and conflicts in Turkana County.



Source: Researcher, 2017.

Even though the end results of the impacts of climate as shown in the figure above are not within the scope of this study, it was evident that climate induced resource based conflicts have devastating effects in Turkana County socially, economically and politically.

3.6 Institutional Conflict Interventions

The National Policy on Conflict Transformation and Peace Building was established to enhance the Kenya Government's ability to respond to internal conflicts through a comprehensive and proactive approach that fosters strong collaborative partnership between the government and other interested parties such as civil society, private sector, non-governmental organizations, grassroots communities and regional organizations. However, none of the specific objectives addresses environmental issues especially mitigation to climate change. Nongovernmental players have directed much of their efforts in alternative economic ventures such as agriculture in a bid to reducing poverty and raising food security levels. While this approach has worked in the few agriculturally potential areas in the upper belt where peace has been restored, the same has totally failed in the lower side where massive crop failure has been experienced due to drought.

The Turkana being pastoralists, would rather provide water for their animals than use it for irrigation. As observed by Bond et al,¹⁴³ to have peace among pastoral communities, massive activities geared towards mitigation of climate change must be instituted. Institutional interventions must therefore address the main root causes of conflicts rather treating aspects such as cattle rustling as the end cause of conflicts. The Kenyan government reaction to quell conflicts in this region has largely failed because of the approach taken. The government has prioritized militarized intervention and the use of judicial system to deal with the problem while ignoring its root causes and application of traditional mechanisms of conflict resolution¹⁴⁴.

¹⁴³Bond, Jeniffer. A holistic Approach to Natural Resource Conflict: The case of Laikipia County, Kenya. *Journal of Rural Studies*, 2014.

¹⁴⁴Mwagiru Makumi, *Conflict in Africa: Theory Processes and Institutions of Management*, 2006, Nairobi. CCR Publications.

3.7 Chapter Summary

It was established that due to climate change, natural resources in Turkana County can no longer bear the pressure. Prolonged droughts are biting and are likely to get worse. Human suffering due to lack of food and fresh water has reached alarming levels. Animals have died because of drought thus leaving the Turkana people economically vulnerable. These climate change impacts are compounded with surging population growth, poor land use, and tribal conflicts between the Turkana and their neighbours, the Pokot and Samburu. Migration is affected by boundary conflicts and does not serve any more as adaptation strategy. The end result is that the area is riddled with poverty, underdevelopment, dilapidated infrastructure and lack of social amenities including schools and healthcare. Agencies for peaceful conflict resolution are minimal as the region has been marginalized for a long time because of the climatic conditions. It is therefore important to increase the adaptive capacity of Turkana people to cope with the changes through relevant policy frameworks. Some of the policies that need to be considered include livestock marketing and take-off programmes, grazing planning and control of animal densities, veterinary services among others. Provision of clean and safe water, food and animal feeds is necessary for both human and livestock during dry spells. However this can only be achieved when there is a coordinated and all inclusive approach aimed at sustainable development and reduction of conflict¹⁴⁵.

¹⁴⁵Swift J., Barton D., Morton J. (2002). Drought management for pastoral livelihoods – policy guidelines for Kenya.

CHAPTER FOUR

CLIMATE CHANGE GOVERNANCE IN THE HORN OF AFRICA

4.1 Introduction

Climate change governance is a relatively new concept to many governments in the Horn of Africa. It refers to the activities undertaken by states and its agencies in minimizing or preventing the negative effects of climate change on the people and their environment. Globally climate change governance is exercised through development and adoption of relevant legislation, policies, institutional and management frameworks which are binding to all member states. Such instruments are then domiciled and operationalized in national legal frameworks of each state. Climate change governance programmes require huge financial support especially to developing countries that have minimal capacity to implement such mitigating mechanisms. Harmonization across all sectors to ensure compliance and accountability is therefore very key at global, regional and national levels¹⁴⁶. Climate change governance seeks to devise and explain mitigation and adaptation strategies adopted by a variety of political and social structures at different levels in response to the ever increasing climate change risks as well as strategies to stem any fall out that may occur as a result of implementation of such measures.¹⁴⁷

4.2 Importance of Climate Change Governance

Scientific research has shown that globally, climate is changing resulting in adverse consequences for all living things (flora and fauna) as a result of human activities.¹⁴⁸ Human activities however remain the most distinct contributory factor to climate change. The change in climate presents formidable challenges to governments and local communities particularly

¹⁴⁶AMCEN (2011): Addressing Climate Change Challenges in Africa; A Practical Guide Towards Sustainable Development.

¹⁴⁷Lawrence, F., "Drought in east Africa the Result of Climate Change and Conflict," The Guardian, Monday 4 July 2011

¹⁴⁸IPCC, 2007, Contribution of Working Group II to the Fourth Assessment *Report of the IPCC*.

those with little capacity to cushion vulnerable members through sustainable development. Such challenges include food insecurity, health complications, desertification, flooding, migrations and susceptibility to conflict. This is even more poignant to marginalized populations (mainly pastoralists); those living in climate change vulnerable regions such the Horn of Africa, where people have low coping capacity that exposes them to frequent conflicts.¹⁴⁹

Many studies have since established a nexus between climate change and conflict on a global scale, and more so in the developing countries.¹⁵⁰ For instance, climate change has a profound negative impact on natural resources such as land and water which in turn compromises food security leading to conflicts particularly in the Horn Africa. To this extent, climate change is considered a security threat and not just as an environmental phenomenon requiring immediate intervention. The framework for the intervention is what is now referred to as climate change governance.¹⁵¹

Since the 1990s climate change has been among the top agendas for researchers and policy makers at local and international levels. Until a decade ago, many authors had been preoccupied by the causes, manifestations and impact of climate change such as variations in temperatures, precipitation, rising sea levels, receding mountain snow-caps and glaciers, and their impact on the survival of the human race and other organisms. Little was done to analyse the relationship between climate governance and the socio-economic and political facets of climate change.¹⁵²

The adoption of effective climate change governance policies/practices is however challenging to current socio-political administrative units given the transnational nature of the

¹⁴⁹OXFAM, 2011, Horn of Africa Drought: Climate Change and Future Impacts on Food Security

¹⁵⁰Ibid

¹⁵¹IPCC, 2007, Contribution of Working Group II to the Fourth Assessment *Report of the IPCC*.

¹⁵²UNEP, 2012. "Financing Renewable Energy in Developing Countries; Drivers and Barriers for Private Finance in Sub-Saharan Africa", UNEP Finance Initiative New York

measures on one hand, and the fluidity of political orientation of the units themselves. In essence, the implementation effective climate change governance system is hampered by neo-realist persuasions underlying international and at times the most basic (localized) relations. Indeed, the danger posed by climate change is not sufficiently appreciated by a few policy and opinion leaders who however exercise considerable influences on key climate change governance strategies. Such disagreements by ‘climate change deniers’ have significantly hampered and delayed the development of an effective climate governance framework with the capacity to controlling violent conflict around the world.¹⁵³

Resistance to climate change governance measures by change many communities, entrepreneurs, academic and policy makers is mostly due to the accompanying short term costs, the inadequate capacity to see the measures through and a mere reluctance to abandon their way of life in the face of the looming environmentally induced/acerbated conflicts.¹⁵⁴

Climate change is with us today, and that its effects are devastating is not new. The concern of the science community today is not to establish the contributing agents to climate change but rather what needs to be done in response to the change.

According to the fourth assessment report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) 2007, natural disasters such as wildfires, flooding and insect infestation in combination with climate change will overwhelm the ecosystem by the turn of the century. Human activities like land use change, pollution and mining will further exacerbate the situation. Rapid urbanization in developing countries are known to take place along coastal and flood plain areas. Such areas are likely to witness disruptions with a heavy toll on health services, water and power supply, food security and economic development. The urban poor

¹⁵³ Wolf, A. T. (1999). “Water wars” and water reality: conflict and cooperation along international waterways. In S. Lonergan (Ed.), *Environmental change, adaptation, human security* (pp. 251e265). Dordrecht, The Netherlands: Kluwer Academic.

¹⁵⁴ IPCC, 2007, Contribution of Working Group II to the Fourth Assessment *Report of the IPCC*

will be mostly affected due to their high vulnerability to environmental disruptions and limited adaptive capacity to these changes.

The need for climate change governance in today's world cannot be overemphasised. To emphasise this notion, John Holdren, President Barak Obama's Science Advisor on several occasions mentioned that there are only three ways the world could deal with climate change: mitigation, adaptation, and suffering. That is to say that the world will have to endure less loss and disruption if climate change is limited and its impacts minimised.¹⁵⁵ Climate change governance has indeed attracted the attention of not only the academic community but the political class as well. A common consensus in the discourse is the need to not only do more in terms of mitigation and adaptation to reduce the penultimate suffering, but also actions that accomplish mitigation and adaptation goals simultaneously should be sought and prioritised.¹⁵⁶

A number of justifications for such governance strategies can be cited. For example, the irreversible nature of some changes in climate that the globe is already witnessing, the conflicting national interest that make future actions of mitigating climate change effects uncertain and the required time for the development of new technologies and the deployment of existing technologies and strategies to reduce greenhouse gas (GHG) emissions.¹⁵⁷

Fusel,¹⁵⁸ suggests four compelling arguments for the need to govern climate change. His first argument is that the effects of Green House Emissions (GHE) are already felt and is contributing to climatic extremes and unprecedented variability. Secondly he opines that

¹⁵⁵Holdren J (2008) Science and technology for sustainable well-being. *Science* 319, p 431

¹⁵⁶ Moser SC (2009) Good morning, America! The explosive US awakening to the need for adaptation. California Energy Commission, Sacramento. <http://www.csc.noaa.gov/publications/need-for-adaptation.pdf>. P, 1

¹⁵⁷ Waite, M. 2012. Climate-change mitigation and adaptation in small island developing states: the case of rainwater harvesting in Jamaica. *Sustainability: Science, Practice, & Policy* 8(2):81–87.

¹⁵⁸Pandey, D., Gupta, A., & Anderson, D. 2003. Rainwater harvesting as an adaptation to climate change. *Current Science* 85 (1):46–59

climate change is inevitable and will continue indefinitely as attested by the records from fossil data. Fusel's third observation is that GHG accumulation is directly proportional to the global warming rate. Fourthly he says that strategic actions do not easily influence the effectiveness of adaptation programs implemented whether locally and/or regionally and that there is a rising impetus of attention among development organizations to financially assist climate adaptation programs. To this end a growing number of climate change assessment techniques have been implemented.

Hayes¹⁵⁹ contends that aspects of climate change governance measures have always been practiced by societies and governments in responding to climate variability. It is however difficult to differentiate these measures from those taken to respond to human induced climate change which are also similar to efforts put in by other professions and state actors. Overtime, constraints of climate has necessitated many societies and civilizations to implement measures such as irrigation systems and dams to deal with shortage of water during dry spells. A good example is Egypt's Nile River irrigation system. Likewise dams are erected to control and store water during rainy season when exceeding abundant water causes flooding. Fussel and Klein¹⁶⁰ also points out that while it is important to note the degree or extent of influence of the adaptation mechanisms, it is not easy to monitor and evaluate the results and impacts of adaptation programs in aiding its intended target groups. A high degree of uncertainty exists regarding the extent to which programs rolled out are able to limit the consequences of climate change. The lack of measure to ensure the effectiveness of adaptation programs is a major course of concern to international funding institutions that demand for accountability. Moreover, adaptation strategies tend to have localized benefits as

¹⁵⁹Payet, R. &Agricole, W. 2006. Climate change in the Seychelles: implications for water and coral reefs. *Ambio* 35(4):182–189.

¹⁶⁰Pandey, D., Gupta, A., & Anderson, D. 2003. Rainwater harvesting as an adaptation to climate change. *Current Science* 85 (1):46–59

opposed to other mitigation measures which have global impact.¹⁶¹ Unfortunately, poor communities living in under developed countries that produce the least of greenhouse gases (GHG) experience the brunt of climate change in terms of cost and consequences.

It is estimated by United Nations Framework Convention on Climate Change (UNFCCC) that by 2030, adaptation to climate change will require financial investment totalling to about \$49-171 billion. Developing countries alone will require \$28-67 billion.¹⁶² In order to reduce such huge spending, there is need for improvement and preparedness among African states to deal with climate change. It is globally recognised that climate change mitigation and adaptation programmes are costly to implement. However this realization alone should not absolve governments from their legal obligation to develop, improve and domesticate climate change governance policies in their development agendas. Climate issues cuts across all development sectors, both government and private. Some of the development projects undertaken by the private sector in Africa are climate sensitive even though very little effort have made by respective governments through legislation and regulations to enable them cope with the risks of climate variability and change. Climate change challenges are global and thus calls for an all-inclusive approach to address them. The Horn of Africa in particular need to develop a unified approach to deal with climate change governance. Challenges that need to be addressed include engagement with other stakeholders in climate change governance, transparency and accountability on climate change commitments, developing monitoring and reporting mechanisms, and liaison among member states to enhance capacity for accessing global funds. A major challenge for African states is enforcement and compliance with agreements meant to mitigate the impacts of climate change. As mentioned earlier, most governments do not have the economic capacity to implement these policies,

¹⁶¹ Bates B., Z. Kundzewicz, S. Wu, & J. Palutikof. (Eds.). 2008. Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change. Geneva: IPCC Secretariat. <http://www.ipcc.ch/pdf/technical-papers/climatechange-water-en.pdf>.

¹⁶² United Nations Framework Convention on Climate Change, 2007.

hence the lapse. Common approach to environmental issues affecting Africa should therefore be undertaken by the African Union (AU) in collaboration with other stakeholders, international community as well as regional economic communities.¹⁶³

4.3 Climate Change Governance Strategies and Challenges

To say that nothing has been done to address the climate change effects is an understatement. A number of strategies have in fact been put in place towards such efforts. The strategies include behavioural changes, such as eating food with minimal embodied energy, use of clean energy for domestic cooking, adapting environmentally safer means of transport and using energy-efficient devices such as light bulbs and appliances. In the meantime, a number of challenges hamper effective climate change governance strategies. For example, in the Small Island Developing States (SIDS), the barriers border long time scales because of the gradual nature of climate-change effects and thus demands a discount rate that appreciates the net present benefits of action plans.¹⁶⁴ Other challenges border disagreements on priority on environmental resources such as energy sources, protection of the coastal areas and availability of water. Further many countries with stagnant economies are experiencing financial constraints on how to combat climate change impacts which have no known scientific time bounds.¹⁶⁵

Socioeconomic challenges have also been cited as barriers to climate change governance, particularly those measures taken to respond to rising sea level that affect the coastal areas. It must be noted at this point that climate change governance requires basic strategies that should be achievable by any committed nation. One of the strategies for example is rain water

¹⁶³ African Climate Change Strategy, 2014.

¹⁶⁴ Tisdell, C. 2008. Global warming and the future of Pacific Island countries. *International Journal of Social Economics* 35 (12):889–903

¹⁶⁵ Waite, M. 2012. Climate-change mitigation and adaptation in small island developing states: the case of rainwater harvesting in Jamaica. *Sustainability: Science, Practice, & Policy* 8(2):81–87.

harvesting. It is baffling that even nations with sufficient rainfall like Jamaica can suffer water shortage in dry seasons. It is true that dry seasons compounded by the effects of climate change worsen situations and if no good governance strategies are put in place such countries are bound to suffer. During such times, economic institutions such as agriculture and tourism experience reduced performance due to water restrictions and other economic hardships.

As already mentioned above, a number of adaptation measures are not new or unique. They are already adopted and practiced by regional and national governments in programs designed during urban planning such as disaster risk management, flood management and coastal resource management.¹⁶⁶ Other public institutions such as health and agriculture are also in realm of developing climate change adaptation measures in public health management and in areas of research for pest, drought or flood resistant crop species. However, it is important to acknowledge that the subject of climate adaptation is still a young discipline in history having gained prominence about ten years ago. Further climate change is being experienced at an alarming rate that the world systems, both ecological and human communities do not have the ability to cope and adapt with. This calls for inter-disciplinary approach and involvement of actors who were traditionally not concerned with issues of climate change, planning and development. Other disciplines such as sociology, gender and atmospheric science need to be incorporated.

Lately decision makers and planners have gained critical information from climatic science on how to determine the magnitude and trajectory of impacts induced by climate change. However, policy makers and urban planners are still at a loss in predicting the ever changing climatic conditions. They can only take into account risks posed by natural disasters such as floods, storms and earthquake. Uncertainty still exists on the extent to which climate change

¹⁶⁶Waite, M. 2012. Climate-change mitigation and adaptation in small island developing states: the case of rainwater harvesting in Jamaica. *Sustainability: Science, Practice, & Policy* 8(2):81–87.

affect food security, health, and ecological balance leading to vulnerability and hence conflict. The nature of climate change is such that it encompasses local, national and global boundaries, overlapping and interacting with several layers of ecological systems¹⁶⁷. Its effects are felt for a long period of time affecting social, economic and environmental spheres.

The availability of data is therefore very crucial for policy makers to develop effective adaptation policies. Adaptation measures are only effective if it is able to account and anticipate the magnitude of shock it is designed to suppress. Without reliable data, overestimation or underestimation of the magnitude of impacts may lead to wastage of resources that could be better deployed to other needy programs. It is such uncertainties and limitations that causes prolonged exposure to climatic stress.

The reviewed literature reveals many approaches to climate change governance. The common approach addresses increased resilience for both humans and the ecological system. A system's resilience is considered strengthened when it is able to absorb prolonged disruptions and shocks. A strengthened system is expected to reorganise itself when environmental changes occur and be able to retain the same structure, functions, and responses.¹⁶⁸ It will be simplistic to say that resilience is only a return-to-original-state process. According to Walker and colleagues, resilience means adaptability and transformability in relation to social-ecological system such as urban environment.

Resilience to climate change is therefore measured by the capacity to retain organic function while continuously responding to, and withstanding the effects of climate variability. Resilience to climate change requires governments to plan along the following parameters; (i)

¹⁶⁷Tisdell, C. 2008. Global warming and the future of Pacific Island countries. *International Journal of Social Economics* 35 (12):889–903

¹⁶⁸ Wisner, Ben, Blaikie, Piers, Cannon, Terry, Davis, Ian, 2004. *At Risk: Natural Hazards, People's Vulnerability and Disasters*, second ed. Routledge, New York.

autonomous and decentralized decision making capacity to enable quick response to specific regions, (ii) resource accountability and transparency, (iii) inclusive participation of all relevant agencies, and (iv) responsiveness and flexibility.¹⁶⁹ Further, effective resilience strategies require corporation among concerned agencies, the vulnerable community and the presence of political good will. A community that have frequently suffered climate change related hazards are easier to deal with as they have the knowledge and experience to positively respond to adaptive measures.¹⁷⁰ Resilience is an important aspect when assessing adaptive capacity. It is equally vital for hazard researchers to know whether resilience of a community has been developed out of a process or an outcome in order to apply it to conflict or disaster prevention.¹⁷¹

4.4 Chapter Summary

Climate change governance is relatively new field in the context of the Horn of Africa and its member states. Individual states have developed adaptation programmes but their effectiveness are still low given the magnitude of climate change related social economic challenges being experienced. Many studies have since established a nexus between climate change and conflict on a global scale, and more so in the developing countries. The change in climate presents formidable challenges to governments and local communities particularly those with little capacity to cushion vulnerable members through sustainable development. Such challenges include food insecurity, health complications, desertification, flooding,

¹⁶⁹ Turner BL II, Kasperson RE, Matson PA, McCarthy JJ, Corell RW, Christensen L, Eckley N, Kasperson JX, Luers A, Martello ML, Polsky C, Pulsipher A, Schiller A (2003) A framework for vulnerability analysis in sustainability science. *Proc Natl Acad Sci U S A* 100(14):8074–8079

¹⁷⁰ Lasco R, Pulhin F. 2009. *Agroforestry for Climate Change Adaptation and Mitigation*. An academic presentation for the College of Forestry and Natural Resources (CFNR), University of the Philippines Los Baños (UPLB), Los Baños, Laguna, Philippines.

¹⁷¹ Paton, D., Johnston, D., 2001. Disasters and communities: vulnerabilities, resilience, and preparedness. *Disaster Prevention and Management* 10 (4), 270–277; Paton, D., Johnston, D., 2006. *Disaster Resilience: An Integrated Approach*. Charles C. Thomas, Springfield, IL; Bruneau, M., Chang, S.E., Eguchi, R.T., Lee, G.C., O'Rourke, T.D., Reinhorn, A.M., Shinozuka, M., Tierney, K.T., Wallace, W.A., von Winterfeldt, D., 2003. A framework to quantitatively assess and enhance the seismic resilience of communities. *Earthquake Spectra* 19 (4), 733–752; and, Tierney, K., Bruneau, M., 2007. Conceptualizing and measuring resilience: a key to disaster loss reduction. *TR News* May–June, 14–17

migrations and susceptibility to conflict. Socioeconomic challenges have been cited as barriers to climate change governance, especially those in response to sea-level rise such as coastal retreat and prolonged drought. However, it must be noted that climate change governance requires basic strategies such as harvesting of rain water that should be achievable by any committed nation.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents the summary of the findings, the conclusion and recommendations. The influence of climate change on environmental resources that lead to conflict has been outlined as discussed in the objectives of the study. The chapter provides recommendations for mitigation of climate change that hopefully will reduce conflict in the study area.

5.2 Summary of Key Findings

This study was underpinned by the need to establish correlation between climate change, resource scarcity and violent conflict. The first objective sought to examine and analyse factors that predispose arid zones, specifically Turkana County to violent conflict. The assumption underpinning this objective is that climate change may have negative consequences on human life quality. As such changes in climate impact environmental resource availability which includes acceleration of water loss and soil degradation that complicates food production processes including loss of pasture. Climate change is expected to similarly impact changes in sea levels. Significant here are water bodies around Turkana County including pans and boreholes that are inter-communally shared. These radical changes ultimately begin causing tensions and survival anxieties and thus population displacements and migrations.

Pressure on renewable resources has potential for triggering violent conflicts. It follows from the logical trajectory that there have been violent repercussions associated with climate change since mid-1990s. It is established that scarcity of essential resources such as water or arable land have a potential of violent conflict along three possible pathways. The first pathway may involve economic decline or quality of natural resources which may lead to

violent conflict due to shrinking natural resource base. Competition over scarce resources and worsening living conditions breed frustration and a sense of dispossession. Further, violent conflict is likely when elites in the society try to shift distribution of resources in their favour. Sudden deviations in rainfall patterns may lead to poor harvest and/or grazing land shortage and weaken economic activities that heavily depend on agriculture. In this sense, Sub-Saharan Africa to which Kenya and extension Turkana County is included, is heavily dependent on rain-fed agriculture for income and food production and range lands for grazing. Violent conflict may be prompted with loss of livelihood and reduction of employment opportunity in the sector that supports the economy. The second pathway is through weakness of political institutions. Scarcity of resources may lead citizens to lose confidence in their government because of inability to provide basic necessities such as health care and education. The third channel relates to migration of people fleeing from uninhabitable places. As persons seek resources to replace the depleted resources, conflict may arise between natives and immigrants. Immigration may also reduce the capacity of the host community to provide adequate basic services for all thereby heightening the probability of violent conflict and also breeding a fertile ground for recruitment of radicalized youths to engage in violence.

5.3 Conclusion

While climatic change generally tends to increase the risk of conflict especially in natural resource strained regions like the Horn of Africa, its effect varies tremendously, with the main mediating factor being the state's ability to react and deal with the situation. This largely depends on the existing institutional framework prior to the occurrence of conflict. Climate change indirectly contributes to exacerbation of conflict in Turkana County by occasioning environmental resource scarcity which leads to fierce competition for survival of

the community. Undoubtedly, the implementation of a robust Climate Change governance mechanism that harmonizes the various policy frameworks (local, regional and global) can go a long way in controlling violent conflicts in Turkana and other fragile environments such as the pastoral regions of the Horn of Africa. On the other hand, climate change has enhanced international co-operation as many countries recognize the collective value of working in collaboration to tackle the challenges. Regional and sub-regional partnerships have been built to provide collective solutions to the challenges of climate change. Peace building processes have also benefitted from such cooperation as issues of peace and security are addressed in these forums. Resources that are shared among border communities are an important aspect of peace building. These include rivers, lakes, pasture and lands. To this end there is need to manage water sources, grazing land and livestock in Turkana County in order to reduce environmental degradation and conflict.

5.4 Recommendations

5.4.1 Policy Framework for Climate Change Governance in Horn of Africa

The Horn of Africa in collaboration with other stakeholders needs to develop policy pathway to deal with impacts of climate. Given that the region has experienced violent conflicts for a long period, its adaptive capacity is severely lowered. Policies and programmes should be incorporated in medium and long term development programmes such as Sustainable Development Goals with a view to enhancing resilience and reducing environmental risks. The policies should also aim at providing early warning systems. For marginalized (Pastoral) areas such as Turkana County, affirmative action approach should be adopted to ensure that the impacts of climate change do not degenerate into violent conflict. The issue of resource scarcity

should be addressed by providing for more water sources (sinking boreholes) and food relief.

5.4.2 Enhancing Climate Resilience and Adaptive Capacity

The Horn of Africa states like other states in the continent largely depend on rain-fed agriculture and livestock keeping as key economic sectors and which are vulnerable to impacts of climate change. Special attention should be paid to these sectors and especially pastoral regions. Drought resistant and quick maturing seeds should be introduced to farmers while herders must be encouraged to keep limited number of animals that can resist drought and diseases. This would ensure that the likelihood is not severely affected by the impacts of climate change. Another important aspect of adaptive capacity building is change of consumption and production behaviour. Communities can increase their resilience through adjustments in the type of food they eat, energy consumption and use of technology. In Turkana County in particular, conflict-sensitive adaptation requires introduction of other means of livelihood such as sedentary farming, reduction of the number of animals, preservation of the environment and availability of more water sources. Migration as a coping mechanism should be regulated to reduce conflicts over resources. The county administration must appreciate the traditional coping mechanisms of this pastoral community and strengthen them to enhance resilience.

5.4.3 Low Carbon Growth Initiative

While the continent of Africa produces the least Global Greenhouse Gas (GHG) significant effort should be made to reduce GHG emissions in their long and medium term development plan initiatives. Alternative energy generation such as geothermal

energy will lower the amount of greenhouse gases emitted into the atmosphere. The traditional road transport sector is responsible for production of carbon. This can be gradually be changed to rail that uses clean energy. Burning of vegetation cover is another culprit in carbon emission. Conservations of forests and planting of more trees is encouraged in order to have a low carbon environment. States should integrate climate change knowledge into development planning, environmental education in schools and community awareness campaigns to reduce deforestation through the utilization of energy saving methods and community agro-forestry initiatives especially indigenous tress.

5.4.4 Peace Building Campaign

Conflicts and especially violent ones are in normal circumstances not a preferred option when other ways to find resolution exists. Conflicts are destructive and costly. Therefore peace building campaigns do go a long way in ensuring that communities are able to share scarce resources without resorting to violence. In marginalized regions, few government agencies exist to help in dispute resolution. In such circumstances, the local dispute resolution mechanisms are important and must be strengthened through peace campaigns. The communities have the capacity to negotiate, mediate and reach consensus faster that the adversarial legal systems. Land and boundary disputes are an example of conflicts that the traditional conflict resolution mechanisms have been able to resolve. This is crucial since land ownership in pastoral community within the Horn of Africa is mainly communal.

5.4.5 Enhancing Cross-Border Managing of Resources

Pastoralists know no boundaries provided that their animals can access water and pasture. This phenomenon is true across the African continent where pastoralists cross borders in search of pasture and water. Where such resources are not well managed, deadly conflicts have been witnessed. Likewise, the impacts of climate change cuts across all political boundaries and, as noted, may induce voluntary and proactive migration due to resource scarcity and conflict. The Turkana community often moves to other regions across the borders namely; Uganda, South Sudan and Ethiopia. This can easily degenerate into an interstate conflict. For this reason, resources which are shared by states such as rivers and lakes should have cross border management authorities to enhance coordination and cooperation on conflict related issues. The fragile Lake Turkana ecosystem is particularly at risk due to the damming of River Omo on the Ethiopian side ostensibly to generate hydro-electric power and crop farming.

5.4.6 Development of an Early Warning System

Harsh climatic conditions are not new occurrence to the pastoralist communities. Their nomadic life has adapted to this setting. However, the advent of climate change has introduced new weather patterns where dry spells or rains are not predictable and are erratic. Further population growth and other structural changes have increased resource scarcity and lowered their natural adaptation capacity. There is therefore need of expanding ways to cope with droughts through a mechanism that leverages on modern innovations such an Early Warning System (EWS). Pastoralists have over time used migration as a coping mechanism. When adequate information is availed to

them, chances of migrating to wrong destinations would be avoided hence less conflict. They would also be able to utilize well the available resources knowing the time spans when to expect rains and pasture.

References

- Adano, Wario R, Ton Dietz, Karen Witsenburg, and Fred Zaal. 'Climate Change, Violent Conflict and Local Institutions in Kenya's Drylands'. *Journal of Peace Research* 49, no. 1 (January 2012): 65–80. doi:10.1177/0022343311427344.
- Adano et al., 'Climate Change, Violent Conflict and Local Institutions in Kenya's Drylands'.
- Adger, N. (2006), 'Vulnerability', *Global Environmental Change*, 16, pp 268-281.
- Alexandre S. Wilner, 'The Environment-Conflict Nexus: Developing Consensus on Theory and Methodology', *International Journal* 62, no. 1 (2006): 169, doi:10.2307/40204253.
- Baechler, Günter. 1999. *Violence Through Environmental Discrimination: Causes, Rwanda Arena, and Conflict Model*. London: Kluwer Academic Publishing.
- Baechler, Günther, 1999: *Violence through Environmental Discrimination* (Dordrecht: Kluwer).
- Ban, K.-M. (2007). A climate culprit in Darfur. *The Washington Post*, (16 June).
- Barnett, J., 2000. Destabilising the environment-conflict thesis. *Review of International Studies* 26 (2), 271–288
- BBC, 'BBC News' (BBC, 2006), <http://news.bbc.co.uk/2/hi/africa/4744812.stm>.; BBC, 'BBC News', Kenya Drought 'Worsens Conflict (BBC, 2006).
- Bernauer T, Böhmelt T, Buhaug H, Gleditsch N P, Tribaldos T, Weibust E B and Wischnath G 2011 *Intrastate Water-Related Conflict and Cooperation: A New Event Dataset* unpublished
- Bhavnani, R. (2006), "Natural Disasters Conflict", Harvard University, <http://rakhibhavnani.ca/bhavnanisummary.pdf>
- Boko M, Niang I, Nyong A, Vogel C, Githeko A, Medany M, Osman-Elasha B, Tabo R and Yanda P. 2007. *Africa. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Parry M L, Canziani O F, Palutikof J P, van der Linden P J and Hanson C E (eds). Cambridge University Press. Cambridge UK. pp. 433 – 467.
- Brancati, D. (2007), "Political Aftershocks: The impact of Earthquakes on Intrastate Conflict", *Journal of Conflict Resolution*, 51, 5, pp. 715-743
- Brown, L., 1977. *Redefining national security*. Worldwatch Paper No.14, Worldwatch, Washington.
- Brown, O., Hammill, A. and McLeman, R. (2007) *Climate Change as the New Security Threat: Implications for Africa*.
- Buhaug, Halvard, 2010: "Climate not to blame for African Civil Wars", in: *Proceedings of the National Academy of Sciences of the USA*, 107,38 (September): 16477–16482.
- Buhaug, Halvard; Gleditsch, Nils Petter; Theisen, Ole Magnus, 2010: "Implications of Climate Change for Armed Conflict", in: Mearns, Robin; Norton, Andrew (Eds.)

- Burke M B, Miguel E, Satyanath S, Dykema J and Lobell D B 2009 Warming increases the risk of civil war in Africa *Proc. Natl Acad. Sci.* 106 20670–4
- Busby, Joshua; Smith, Todd G.; White, Kaiba; Strange, Shawn M., 2010: “The Sources of Climate Insecurity: Mapping Vulnerability in Africa”,
- Cederman, L.E.; Girardin, Luc, 2007: “Beyond Fractionalization: Mapping Ethnicity onto Nationalist Insurgencies”, in: *American Political Science Review*, 101,1 (February): 173–185; Theisen, Ole Magnus; Holtermann, Helge; Buhaug, Halvard, 2010: “Drought, Political Exclusion, and Civil War”, October
- Ciccone A 2011 Economic shocks and civil conflict: a comment *Am. Econ. Rev.: Appl. Econ.* 3 215–27
- CNA, ‘National Security and the Threat of Climate Change’ (Security and Climate Change, 2007).
- Colin H. Kahl, *States, Scarcity, and Civil Strife in the Developing World* (Princeton: Princeton University Press, 2007); Reuveny, ‘Climate Change-Induced Migration and Violent Conflict’.
- Collier, P., et al, (2003), “Breaking the Conflict Trap, Civil War and Development Policy”, World Bank and Oxford University Press.
- Collier, Paul, and Anke Hoeffler. 2004. “Greed and Grievance in Civil War.” *Oxford Economic Papers* 56 (4): 563–595
- Cullen S Hendrix and Idean Salehyan, ‘International Studies Association Annual Conference’, in *After the Rain: Rainfall Variability, Hydro-Meteorological Disasters, and Social Conflict in Africa*. (Montreal, Quebec, 2010).
- Drury, C. Olson, R., (1998) “Disasters and political Unrest: An Empirical investigation”, *Journal of Contingencies and Crisis Management*, 6, 3, pp. 153-161.
- Falk, R., 1971. *This Endangered Planet: Prospects and Proposals for Human Survival*. Random House, New York.
- Fearon, James D., and David D. Laitin. 1996. “Explaining Interethnic Cooperation.” *American Political Science Review* 90 (4): 715–735
- Gleditsch, K. S., & Weidmann, N. B. (2012). Richardson in the information age: geographic information systems and spatial data in international studies. *Annual Review of Political Science*, 15, 461-481.
- Gleditsch, Kristian Skrede, 2007: “Transnational Dimensions of Civil War”, in: *Journal of Peace Research*, 44,3 (May): 293–309
- Gleditsch, N., 2001. *Armed conflict and the environment*. In: Diehl, P., Gleditsch, N. (Eds.), *Environmental Conflict*. Westview Press,
- Gleditsch, Nils Petter, (1998), “Armed Conflict and the Environment: A Critique of the Literature”, *Journal of Peace Research* 35, 3, pp. 381–400.

- Gleditsch, Nils Petter, 2008: “The Liberal Moment Fifteen Years On”, in: *International Studies Quarterly*, 52,4 (December): 691–712
- Gurr, Ted Robert, 2000: *People versus States. Minorities at Risk in the New Century* (Washington, DC: United States Institute of Peace Press)
- Buhaug, N.P Gleditsch, and O.M Theisen, ‘: Implications of Climate Change for Armed Conflict, World Bank Group: ‘Social Dimensions of Climate Change’, 2008.
- Hagmann, T., & Mulugeta, A. (2008). Pastoral conflicts and state-building in the Ethiopian lowlands. *Afrika Spectrum*, 43, 19e37
- Hany Besada and Nelson Sewankambo, ‘Climate Change in Africa: Adaptation, Mitigation and Governance Challenges’, CIGI Special Report. The Centre for International Governance Innovation, 2009.
- Hartmann, Betsy. 2001. Will the Circle be Unbroken? A Critique of the Project on Environment, Population, and Security. In *Violent Environments*, edited by Nancy Lee Peluso and Michael Watts, 39–64. Ithaca, NY: Cornell University Press.
- Hegre, Harvard, and Nicholas Sambanis. 2006. “Sensitivity Analysis of Empirical Results on Civil War Onset.” *Journal of Conflict Resolution* 50 (4): 508–535.
- Hendrix, Cullen S.; Glaser, Sarah M., 2007: “Trends and Triggers: Climate, Climate Change and Civil Conflict in Sub-Saharan Africa”, in: *Political Geography*, 26,6 (August): 695–715.
- Homer-Dixon, T. F. (1999). *Environment, scarcity, and violence*. Princeton: Princeton University Press.
- Homer-Dixon, T. F., & Percival, V. (1996). *Environmental scarcity and conflict: Briefing book*. Toronto: AAAS.
- Homer-Dixon, Thomas, and Jessica Blitt. 1998. *Eco-violence: Links among Environment, Population, and Security*. Lanham, MD, and Oxford: Rowman and Littlefield
- Homer-Dixon, Thomas. 1991. On the Threshold: Environmental Changes as Causes of Acute Conflict. *International Security* 16 (2): 76–116
- IPCC (2011) IPCC Special report on managing the risks of extreme events and disasters to advance climate change adaptation—Summary for policymakers. International Panel on Climate Change
- IPCC 2007 Fourth assessment report. *Climate change 2007*. Geneva: Intergovernmental Panel on Climate Change, and Cambridge: Cambridge University Press. Available online at www.ipcc.ch
- IPCC, ‘Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge’ (Cambridge, 2007).
- IRIN (2007) Global: More extreme weather in poorer countries. *Integrated Regional Information Networks*, December 11.

- Kahl, Colin, 2006: *States, Scarcity, and Civil Strife in the Developing World* (Princeton, NJ: Princeton University Press).
- Kaitlin A. Shilling, 'Climate Change and Conflict: Identifying the Mechanisms' (Stanford University, 2011), https://fse.fsi.stanford.edu/sites/default/files/Shilling_Dissertation_2011-augmented.pdf.
- Kelman, I. (2006), "Acting on disaster diplomacy", *Journal of International Affairs*, 59, 2, pp. 214-40
- Kelman, I. (2011), *Disaster Diplomacy: How disasters affect peace and conflict*, London, Routledge.
- Kelman, I., Koukis, T. (2000), "Disasters diplomacy", *Cambridge Review of international Affairs*, 14, 1, pp. 145-166.
- Ker-Lindsay, J. (2000), "Greek-Turkish rapprochement: the impact of disaster diplomacy", *Cambridge Review of international Affairs*, 14, 1, pp. 145-166.
- Kibreab, G. (1994). Migration, environment and refugeehood. In B. Zaba, & J. Clarke (Eds.), *Environment and population change* (pp. 115e130). Liege, Belgium: Ordina.
- Kidane Mengisteab, *Critical Factors in the Horn of Africa's Raging Conflicts* (Uppsala: Nordiska Afrikainstitutet, 2011).
- Marshall B. Burke et al., 'Warming Increases the Risk of Civil War in Africa', *Proceedings of the National Academy of Sciences* 106, no. 49 (8 December 2009): 20670–74, doi:10.1073/pnas.0907998106.
- Maxwell, J. and Reuveny R. 2000, *Resource Scarcity and Conflict in Developing Countries*
- Mearns, Robin; Norton, Andrew (Eds.): *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World* (Washington, DC: The World Bank): 103–131
- Meier, Patrick; Bond, Doug; Bond, Joe, 2007: "Environmental Influences on Pastoral Conflict in the Horn of Africa", in: *Political Geography*, 26,6 (August): 716–735;
- Michael Werz and Laura Conley, 'Climate Change, Migration, and Conflict: Addressing Complex Crisis Scenarios in the 21st Century', Center for American Progress, 2012.
- Miguel, Edward, Shanker Satyanath, and Ernest Sergenti. 2004. "Economic Shocks and Civil Conflict: An Instrumental Variables Approach." *Journal of Political Economy* 112 (4): 725-753.
- Murdiyarto, D., 2000. Adaptation to climatic variability and change: Asian perspectives on agriculture and food security. *Environmental Monitoring and Assessment* 61 (1), 123–131
- Nel, P., Righarts, M. (2008), "Natural Disasters and the Risk of Violent Civil Conflict", *International Studies Quarterly*, 52, pp. 159-185
- Nelson, T. (2010) "When disaster strikes: on the relationship between natural disaster and interstate conflict", *Global Change, Peace & Security*, 22:2, 155-174.

Norton, Andrew (Eds.): *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World* (Washington, DC: The World Bank): 103–131.

Oli Brown and Alec Crawford, ‘Climate Change and Security in Africa: A Study for the Nordic-African Foreign Ministers Meeting’, International Institute for Sustainable Development, 2009.

Østby, Gudrun; Tadjoeeddin, Zulfan; Urdal, Henrik; Murshed, S. Mansoob; Strand, Håvard, 2011: “Population Pressure, Horizontal Inequalities and Political Violence: A Disaggregated Study of Indonesian Provinces, 1990– 2003”, in: *Journal of Development Studies* 47,3: 377–398.

Peter Schwartz and Doug Randall, ‘An Abrupt Climate Change Scenario and Its Implications for United States National Security’ (DTIC Document, 2003), <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA469325>.

Rafael Reuveny, ‘Climate Change-Induced Migration and Violent Conflict’, *Political Geography*, no. 26 (2007): 656–73.

Ragnhild Nordås and Nils Petter Gleditsch, ‘Climate Change and Conflict’, *Political Geography* 26, no. 6 (August 2007): 627–38, doi:10.1016/j.polgeo.2007.06.003.

Raleigh, C., Witmer, F., & O’Loughlin, J. (2010). A review and assessment of spatial analysis and conflict: the geography of war. In R. Denemark (Ed.). *The international studies encyclopedia*, Vol. X (pp. 6534e6553). Oxford: Wiley-Blackwell.

Raleigh, Clionadh; Kniveton, Dominic, 2010: “Chronic Communal Conflict and Environmental Pressures”, Paper presented at the Climate Change and Security Conference Trondheim, Norway, 21-24 June 2010.

Salehyan, Idean, 2008: “From Climate Change to Conflict? No Consensus Yet”, in: *Journal of Peace Research*, 45,3 (May), 315–326.

Sanchez, P., 2000. Linking climate change research with food security and poverty reduction in the tropics. *Agriculture, Ecosystems & Environment* 82 (1–3), 371–383.

Schwartz, Daniel M.; Deligiannis, Tom; Homer-Dixon, Thomas, 2001: “The Environment and Violent Conflict”, in: Diehl, Paul F.; Gleditsch, Nils Petter (Eds.): *Environmental Conflict* (Boulder, CO: Westview): 273–295.

Sebastian Oberthür, Dennis Taenzler, and Alexander Carius, ‘Climate Change and Conflict Prevention: The Relevance for the International Process on Climate Change’, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) *Climate Change and Conflict*, 2002.

Slettebak, R. (2012), “Don’t blame the weather! Climate-related natural disasters and civil conflict”, *Journal of Peace Research*, 49, 1, pp. 163-176.

Stern, Nicholas, 2007: *The Economics of Climate Change: The Stern Review* (Cambridge: Cambridge University Press).

Tarhule A (2005a) Damaging rainfall and flooding: the other Sahel hazards. *Clim Change* 72:355–377

The Economist. (2010). Security and the environment: Climate wars. http://www.economist.com/node/16539538?story_id%416539538.

Theisen Ole, Magnus; Helge Holtermann & Halvard Buhaug (2011/12) Climate wars? Assessing the claim that drought breeds conflict. *International Security* 36(3): 79–106.

Theisen, Ole Magnus, 2008: “Blood and Soil? Resource Scarcity and Internal Armed Conflict Revisited”, in: *Journal of Peace Research*, 45,6 (November): 801–818.

Tilly, Charles, 2003: *The Politics of Collective Violence* (New York, NY: Cambridge University Press).

U. N. Wiesmann, S. DiDonato, and N. N. Herschkowitz, ‘Effect of Chloroquine on Cultured Fibroblasts: Release of Lysosomal Hydrolases and Inhibition of Their Uptake’, *Biochemical and Biophysical Research Communications* 66, no. 4 (27 October 1975): 1338–43.

UNDP (United Nations Development Program), 1998. *Human Development Report 1998*. Oxford University Press, Oxford and New York.

United Nations Environment Programme (UNEP), 22008: *Vital Water Graphics. An Overview of the State of the World’s Fresh and Marine Waters* (Nairobi, Kenya: United Nations Environment Programme); at:

Uppsala Conflict Data Program. (2012). *UCDP conflict Encyclopedia*. Uppsala University. www.ucdp.uu.se/database.

van Ireland, E., Klaassen, M., Nierop, T., van der Wusten, H., 1996. *Climate change: socio-economic impacts and violent conflict*. Dutch National Research Programme on Global Air Pollution and Climate Change, Report No. 410 200 006, Wageningen.

Wario R Adano et al., ‘Climate Change, Violent Conflict and Local Institutions in Kenya’s Drylands’, *Journal of Peace Research* 49, no. 1 (January 2012): 65–80,

Wisner, B. (2009) “Interactions between Conflict and Natural Hazard: Swords, Ploughshares, Earthquakes, Floods and Storms” in Brauch (eds), *Facing Global Environmental Change: environmental, Human, Energy, Food, Health and Water Security Concepts*, Berlin, Springer.

Appendix 1- Interview guide

NAME (optional) _____

AGE; (tick one)

Between 20-30

31-35

36-45

Over 45

GENDER; Male

Female

Department of work _____

Position in the organization; _____

How long have you worked with your organization?

Less than one year

Between 1-5 years,

Between 5-10 years,

Over 10 years

1. Climate change is a major concern for people living in arid and semi-arid regions such as Turkana County. How has this affected the livelihood of the people in this county?
2. Turkana County experiences scarcity of environmental resources such as farmland, water, grassland and food. How has this scarcity influenced violent conflict among the Turkana communities?
3. Migration during drought and dry spells has been a common practice for this community. Kindly explain how this practice has contributed to conflict in this region.
4. Cattle rustling is a common practice between the Turkana and the neighbouring communities. How has scarcity of environmental resources impacted on this practice?
5. Climate change governance is relatively a new field that seeks to devise and explain mitigation and adaptation strategies adopted by a variety of political and social structures at different levels in response to the ever increasing climate change. In this regard do you think the climate change governance mechanisms in place in Turkana County are adequately responding to the needs of the people and controlling violent conflict?
6. What other measures can you recommend to be implemented to enhance mitigation and adaptation of the Turkana people against climate change?

THANK YOU.